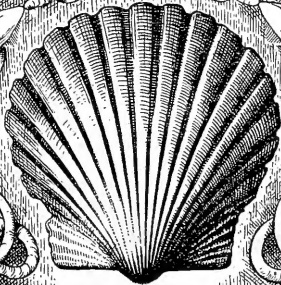


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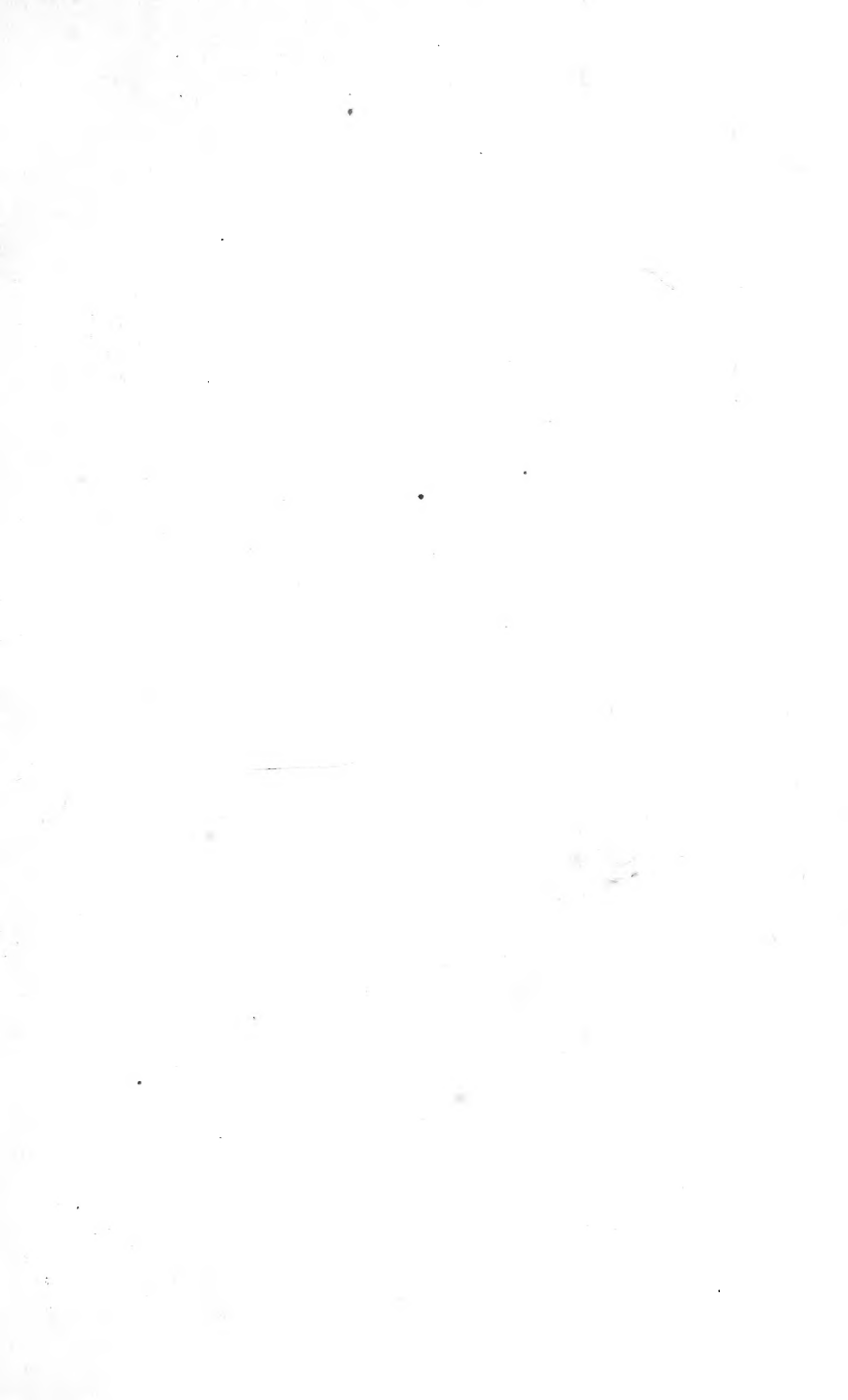


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THE
JOURNAL
OF
CONCHOLOGY.

ESTABLISHED IN 1874 AS
The QUARTERLY JOURNAL of CONCHOLOGY.

CONDUCTED BY
JOHN W. TAYLOR, F.L.S.,

Membre Honoraire de la Société Malacologique de France.

WITH WHICH IS INCORPORATED THE
PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND,
PUBLISHED UNDER THE DIRECTION OF THE COUNCIL.

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The Authors of the several papers contained in this volume are themselves accountable for all the statements and reasonings which they have offered. In these particulars the Editors or the Society must not be considered as in any way responsible.

PREFACE.

The conclusion of the seventh volume of the 'Journal of Conchology' terminates the connection which I have held as its Director and Editor for the long period of exactly twenty-one years. The journal was originally commenced as the 'Quarterly Journal of Conchology' in February, 1874, at a time when the science of Conchology was at a very low ebb in Britain, its students few, scattered, and disorganized, and as a necessary consequence the publication of the work was for years after its inception only carried on by steady sacrifices of time and money. Such sacrifices as were necessary I however cheerfully made, and the publication was persevered with in spite of manifold discouragements and against the advice of many kind and true friends, who looked upon a financial return as the crucial test for all projects, scientific or otherwise. In process of time, however, the exertions and sacrifices I made begun to take effect, more and more interest was taken in the study, and the students and subscribers increased in numbers.

One of the first practical results of this revival was the establishment in 1876, by four Leeds conchologists (Messrs. H. Crowther, W. Nelson, W. Denison Roebuck, and myself) of the Conchological Society. The society when formed gradually increased around this little local nucleus, until at the present time it is quite a powerful organization, though there are still large numbers of students who have not yet allied themselves with us. The vigour and ardour with which conchology is now pursued, and for which happy result the journal may surely claim much of the credit for having fostered and encouraged, is amply and convincingly evidenced not only by the successful establishment of conchological societies in London and Manchester, but by the recent publication of another journal, solely devoted to the subject, which journal I understand is and has been from its commencement a successful financial undertaking, the originator and editor of which periodical himself imbibed his love of conchology in Leeds.

The 'Journal of Conchology' having survived all the dangers of its early life, now occupies a firm and assured position, and will in future be the sole property of the Conchological Society of Great Britain and Ireland, and, as I am anxious to devote my leisure to the speedy production and publication of my 'Monograph of the Land and Freshwater Mollusca of the British Isles,' the journal will in future be under the able editorship of

Mr. W. E. Hoyle, M.A., Manchester, under whose skilful guidance it is hoped to largely increase the scientific value and utility of the publication.

Concurrently with this change, the executive centre of the society, which has been continuously located in Leeds since the formation of the Society there eighteen years ago, will, by the spontaneous initiative of the Leeds members, also be transferred to Manchester, where conchology is now pursued with conspicuous success and enthusiasm by a large number of students.

During the whole of the twenty-one years the journal has been in existence, I have steadily and perseveringly laboured to advance the study and also the interests of the society, and it is to me a source of genuine pleasure and satisfaction to observe the remarkable progress made during late years in the society, and in the science generally. Other societies have sprung up in the kingdom, and perhaps the generous rivalry and emulation which should exist between independent organizations, and their sometimes divergent aims, may tend more to the extension of our knowledge of the science and to the increase in the number of its votaries, than if acting entirely in unison.

In taking leave of the members of the society and conchologists generally, as their editor, and as an active participant in the work of the Society, I cannot refrain from thanking every one for the kindly consideration always shown me. The office has given me the privilege and pleasure of the acquaintance and, I venture to hope, the friendship of many persons whom I shall ever esteem for the many kindnesses and courtesies they have always heaped upon me.

J. W. T.



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THE
JOURNAL
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CONCHOLOGY.

THE RELATION OF THE LAND AND FRESHWATER
MOLLUSCA OF THE MADEIRAN ISLANDS, TO
THOSE KNOWN ELSEWHERE.

BY THE REV. R. BOOG WATSON, B.A., F.R.S.E., F.L.S.

BEING HIS VALEDICTORY ADDRESS AS PRESIDENT OF THE CONCHOLOGICAL SOCIETY
FOR THE YEAR 1891.

The number of inland Mollusca, which excluding mere synonyms have been attributed to these islands, is two hundred and six. Two hundred and six species on an isolated sea-girt speck of the earth's surface—a speck not four hundred square miles in area! The number is enormous. To what extent are these two hundred and six species met with elsewhere? That is the question I propose to answer.

At the very outset, however, a reduction on the above number must be made, for some of these species have obviously no right of admission. Mr. Wollaston, the ablest of all judges, in his 'Testacea Atlantica' cuts down the list from two hundred and six to one hundred and seventy-eight; a reduction of twenty-eight species which everyone will admit have no right of residence whatever. Besides these twenty-eight, there are

two other species which, though passed by Mr. Wollaston, ought, I am persuaded, to be excluded. One is *Helix lapicida*—a species represented by one solitary dead shell ; the second *H. caperata*, of which also only one well-authenticated specimen—and it too a dead shell—has been found, no faith being possible in the two additional specimens supplied with other incredible discoveries to the Baron de Paiva by one of his over-zealous collectors. The addition of these two brings up Mr. Wollaston's reduction to thirty, the deduction of which from two hundred and six leaves one hundred and seventy-six as the number of Madeiran species with which we have seriously to deal. Among the thirty species thus excluded, I have purposely left *Pisidium watsoni* Paiva. I found it in considerable numbers and gave specimens of it to the Baron de Paiva, who published it without my permission. It has never been carefully examined, and Mr. Wollaston did well to ignore it, though, as in Madeira the solitary representative of its whole class, it is full of interest.

Of the one hundred and seventy-six above-mentioned as true inhabitants of Madeira, nine species are semi-marine. These are *Pedipes afra* Gmel., *Melampus exiguus* Lowe, *Auricula æqualis* Lowe, *A. watsoni* Woll., *A. gracilis* Lowe, *Alexia paiwana* Pfr. (Selvagens), *Truncatella truncatula* Drap., *T. lowei* Shutt., *Assimineæ litorea* d. Chiaje ; these though air breathers are really sea-dwellers, and in any question of distribution must go with the Marine rather than with the Terrestrial species. Deducting then these nine from the one hundred and seventy-six there remain one hundred and sixty-seven Terrestrial species, and of these only thirty-four species are found anywhere else than in this little group of islands. I say thirty-four, not thirty-five, because the solitary specimen of a fresh but empty shell of *Lovea tornatellina* Lowe which I found in Grand Canary does not entitle it to rank as a Canarian species.

Thirty-four then of the Madeiran species are all which this group of islands has in common with the rest of the world. The overlap is very small, but even this must be reduced.

There are six species which have been so very recently introduced that they can hardly be considered as more naturalized than would any number of species carried over in one's pocket and turned loose in one's garden. These six species are *Testacella haliotide* Drap., *Helix* (*Pomatia*) *aspersa* Müll., *H. (Patula) rotundata* Müll., *Planorbis glaber* Jeff., *Physa acuta* Drap., *Hydrobia similis* Drap. The removal of these six leaves twenty-eight as the whole number of really native species found in Madeira and which are to be met with elsewhere. Looking carefully at the distribution of these species within the Madeiran area, it is possible with a very considerable amount of probability to divide them into six classes :

1. Species whose introduction is earlier than all record, but is probably quite recent. These are six in number, viz. :—*Arion ater* L., *Limax maximus* L., *L. flavus* L., *L. agrestis* L., *Testacella maugei* Fer., *Bulimus (Stenogyra) decollatus* L. These are sparingly found within human cultivation.

2. Importations dating from a much earlier period in the five hundred years of human occupation. The seven species of this group are : *Limax gagates* Drap., *Helix (Hyalinia) cellaria* Müll., *H. (Vallonia) pulchella* Müll., *Bulimus ventricosus* Drap., *Zua (Cochlicopa) lubrica* Müll., *Limnæa acuta* Drap., *Ancylus striatus* Q. & G. These are much more widely distributed, but are still confined to districts occupied by man.

3. Importations independent of man. This class includes three species the circumstances of whose distribution indicate that they have been long in the islands, while yet they are not where man would have put them. These three are : *Achatina acicula* Müll., *Pupa (Gastrodont) umbilicata* Drap., *Balea perversa* L. These were probably introduced by natural agencies.

4. A peculiar class. It includes two species which require fuller criticism. *Helix (Xerophila) armillata* and *Lovea folliculus* Grön.

5. Indigenous European species whose birthright is as good in Madeira as elsewhere. In neither can they be called

immigrants. Of these there are four : *Helix* (*Hyalinia*) *crystallina* Müll., *H.* (*Pyramidula*) *pygmæa* Drap., *H.* (*Euparypha*) *pisana* Müll., *H.* (*Caracollina*) *lenticula* Fer.

6. Indigenous Atlantic species which are neither European nor Mediterranean. Of these there are six : *Helix* (*Patula*) *placida* Shuttl., *H.* (*P.*) *pusilla* Lowe, *H.* (*Leptaxis*) *erubescens* Lowe, *H.* (*Spirorbula*) *paupercula* Lowe, *Pupa* (*Gastrodon*) *fanalensis* Lowe, *P.* (*Truncatellina*) *microspora* Lowe. A group this of perhaps the greatest interest and the most instructive of all, but which at present may simply stand as they are.

One hundred and sixty-one species then are the true Terrestrial native shells of the Madeiran Islands, and of these twenty-eight species or a little less than one-sixth are found elsewhere. Twenty-eight species out of one hundred and sixty-one ! That is the whole extent to which we can say that the Terrestrial mollusca of Madeira and elsewhere overlap : and one hundred and thirty-three species have not only had their origin in, that is, are autochthonous for this little group of islands not four hundred square miles in extent, but have never spread further. That of itself is a very remarkable fact deserving of careful notice, but there are circumstances connected with the history of the island which greatly enlarge our intelligence of this fact.

It was in A.D. 1418 that these islands were discovered, and since that period no change of any importance in the condition of the islands has occurred. There has been neither elevation nor depression nor volcanic outbreak of any kind during these five hundred years. Anterior to that period, however, probably long anterior, there must have occurred changes great at least, if not violent—changes of level—variations on the coast line—exhalations of mephitic vapour—outbursts of heated water, which, pouring down the wooded slopes, both killed and swept away in myriads the mollusca whose shells, now semi-fossil, often crushed to atoms, often perfect, mixed with sand, and piled in places many feet deep, cover square miles of Madeira and of Porto Santo. Other beds too, more clayey in

character are found at a high level on the Desertas presenting specimens few in number but of very interesting species—also semi-fossil like those previously referred to. In these beds therefore, geologically recent but chronologically of great antiquity ; parted from us, as they are, by a period whose minimum is five hundred years, a record is preserved quite undisturbed, enabling us to compare the earlier Terrestrial mollusca with those now alive. Following up then, such a comparison, the one hundred and thirty-three genuine Terrestrial mollusca peculiar to Madeira fall into three groups :—

1. The extinct subfossil species.
2. The surviving subfossil species.
3. Living species that are peculiar indeed but not subfossil.

Of the 1st class, comprising the extinct subfossil species, there are twelve.

Of the 2nd group, including the species which are subfossil but which are also living still, there are sixty-four.

Of the 3rd, which contains species living, but not subfossil, there are fifty-seven.

The record is a long and a crowded one—long, for it begins more, probably very much more, than five hundred years ago—crowded, for it speaks of at least seventy-six (*i.e.* 12 + 64) species—all peculiar—many very abundant. From nowhere outside did they come to these islands, but from untold ages previously they may have existed on this spot. Of these seventy-six, twelve species have died out, and sixty-four survive to this present, while fifty-seven species more, not found among these fossils, have come on the scene, and are alive now. Across the page one hundred and thirty-three lines are drawn. Of these, twelve—present where the record begins—break short, they do not come down to our day ; sixty-four, which begin as early, still run on to the present time—and fifty-seven make their appearance. They may have been alive in the earlier period, but they are at least not recorded there.

Between these one hundred and thirty-three lines there is no convergence—the lines are parallel. Traced back there is no imaginary centre on which they can be said to bear. In the earliest period no more than in the latest is there intensification of conformity to that Mediterranean type which stamps them. Between themselves there is no swaying of the lines to and fro, they do not bifurcate, they do not pass over from one form into another, they give off no sports maturing into distinct species. The fifty-seven species which have come in have simply come in from no outside locality, and they have come without warning, and without trace of descent. If in their embryos there were any of those suggestions of collateral relationship of which so much is often made, the lapse of five hundred years has failed to give to these any practical effect. The one feature which the species present throughout the whole record is uncompromising unalterable individuality.

Here then is a multitude of land shells absolutely peculiar to this little sea-girt speck of earth's surface : from nowhere else have they come. What does their record tell? Does their presence imply so many distinct creative acts? That was the answer which was accepted in past days, but it has been discarded and rightly discarded because it was equivocal ; it seemed to say one thing but it really conveyed two. To many people it simply meant 'We don't know how these species came,' but if that is all we mean it would be better simply to say so. If on the other hand, it meant to assert that without the intervention of any secondary causes these species have been called into being by the immediate and reiterated intervention of creative power, then that assertion was a jumping to a conclusion instead of a careful study of the evidence. That the worlds were framed by the Word of God is one thing, but it is a very different thing indeed to say there has been a whole succession of creative acts reiterated again and again. Is that so? That is the very question to which we are trying to find an answer—a true

answer. As a working hypothesis Darwin's so-called theory has proved to many very useful, but no one can doubt that the history of species is a record we are only beginning to decipher, and that here is work for every one of us to do. Worthier work by far than the mere multiplication of species, or the subdivision of genera, or the reduction of scientific nomenclature through constant change to a Babel-like confusion of tongues.

How did all these various forms of life, individually so stable and yet in the long run so changing—how did they come into being? Derived from any known source they are not. The amazing genealogical chains which sensational science delights to construct, are all flawed by the missing links which in them all are missing still. How did the varied forms of life originate? That is the great problem with the solution of which this Society, in common with so many others is occupied—and Madeira with its one hundred and thirty-three peculiar land shells within so small a space really puts into an intelligible form that great question which in its greatness is unmanageable—How did this crowd of perfectly isolated species come into being?



Vertigo pusilla Müll. in Lancashire.—At the meeting of the Manchester Branch, on November 12th, I had the pleasure of exhibiting specimens of this species taken by Mr. F. C. Long, of Burnley, during a visit to Silverdale in July last. They were found amongst moss, and are rather larger and lighter-coloured than the Ingleton specimens. This, being the first-known record for the county, is of considerable interest.—R. STANDEN, *November 16th, 1891.*

Planorbis albus m. *scalariforme* at Penistone.—In the 'Scout Dam' at Penistone I have recently come across numerous examples of *P. albus* m. *scalariforme*. As this form has not apparently been noticed, it may be interesting to note it.—LIONEL E. ADAMS, Penistone, *July 9, 1891.*

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

PROCEEDINGS.

195TH (ANNUAL) MEETING, DECEMBER 12th, 1891.

THE Meeting was opened at the Philosophical Hall, Leeds, at Ten a.m., the Chair being occupied by Mr. JOHN WM. TAYLOR, F.L.S., Vice-President.

The Minutes of the previous Annual (185th) Meeting were read and confirmed.

Donations to Library announced and thanks voted: From the Trustees of the British Museum:—(1), Report on the Zoological Collections made by H.M.S. *Alert* in 1881—82, 1884; (2), A. H. Foord's 'Catalogue of Fossil Cephalopoda,' parts i, 1888, and ii, 1891; (3), J. E. Gray's 'Guide to the Systematic Distribution of Mollusca in the British Museum,' part i, 1857; (4), 'Guide to the Shell and Starfish Galleries of the British Museum,' second edition, 1888; (5), J. E. Gray's 'Catalogue of Mollusca in British Museum,' part iv, 'Brachiopoda Ancylopoda or Lamp Shells,' 1853; (6), Deshayes' 'Catalogue of Conchifera in the British Museum'—part i, Veneridæ, Cyprinidæ, and Glauconomidæ, 1853, and part ii, Petricoladæ (concluded) and Corbiculadæ, 1854; (7), L. Pfeiffer's 'Catalogue of Pulmonata,' part i, 1855; and (8), L. Pfeiffer's 'Catalogue of Auriculidæ, Proserpinidæ, and Truncatellidæ in the British Museum,' 1857.

From the Author: (1), F. W. Wotton 'On the occurrence of *Achatina acicula* in the Cardiff District in two New Localities,' 1889; F. W. Wotton, 'A short Historical Account of the Flat Holme and its Natural History,' 1890.

From the Editors: The Naturalist, for December 1891; Feuille des Jeunes Naturalistes, No. 254, Dec. 1891; L'Echange Revue Linneenne, No. 83, 15th Nov. 1891.

From the Societies: Abstract Proceedings of Linnean Society of New South Wales, Oct. 28, 1891; Journal and Proceedings Hamilton Association (Canada), part vii, 1890—91.

From the Trustees: Records of the Australian Museum, vol. i, No. 9, October 1891.

Candidate Proposed for Membership:

Mr. James Russell Dixon (by Messrs. W. H. Heathcote and John W. Taylor).

Appointment of Scrutineers and Auditors.

It was resolved that Mr. Edward Collier and Mr. Robert Standen be appointed Scrutineers; also that Mr. Wm. Moss, F.C.A., and Mr. Robert Cairns be appointed Auditors both for the current and the ensuing year's accounts.

The Meeting was then adjourned to the Owens College, Manchester.

The Annual Meeting was resumed at the Beyer Laboratory, Owens College, Manchester, at Four p.m.

The chair was occupied by the Rev. R. BOOG WATSON, B.A., F.R.S.E., F.L.S., President, and there was a large attendance of members.

Annual Reports, &c:

The Annual Report of the Council was read by the Hon. Secretary, Mr. W. Denison Roebuck, F.L.S.

The Balance Sheet and Treasurer's Report were read by Mr. Lionel E. Adams, B.A., Hon. Treasurer.

The Annual Report of the Manchester Branch was read by Mr. Robert Standen, Hon. Secretary of the Branch.

After discussion, it was unanimously resolved, on the motion of Mr. R. D. Darbishire, B.A., F.G.S., seconded by Mr. Edward Collier,

"That the Reports of the Council and Treasurer and Branch be received and adopted for circulation among the members, and that the attention of the Council be especially directed to the serious amount of Subscriptions now in arrear, and that the members in default be earnestly requested to facilitate the business of the Society by paying up, and that the Secretary be instructed to stop sending the 'Journal of Conchology' to any member who is more than two years in arrear after notice; and that a copy of this resolution be printed and sent to every member."

Election of Officers:

The Scrutineers then announced that they had examined the voting-papers, of which 34 had been sent in, none of them invalidated by any informality, and that the following members had been duly elected as the Council and Officers for the year 1892 :—

PRESIDENT—Rev. Canon ALFRED MERLE NORMAN, D.C.L., F.R.S., F.L.S., etc., Burnmoor Rectory, Fence Houses, Durham.

VICE-PRESIDENTS — J. COSMO MELVILL, M.A., F.L.S., Manchester; EDGAR A. SMITH, F.Z.S., London; JOHN W. TAYLOR, F.L.S., Leeds; Rev. R. BOOG WATSON, B.A., F.R.S.E., F.L.S., Cardross, Dumbartonshire.

HON. TREASURER—LIONEL E. ADAMS, B.A., Penistone.

HON. SECRETARY AND RECORDER—WM. DENISON ROEBUCK, F.L.S., Leeds.

HON. CURATOR—WILLIAM NELSON, Leeds.

HON. LIBRARIAN—EDGAR R. WAITE, F.L.S., Philosophical Hall, Leeds,

COUNCIL—WALTER CROUCH, F.Z.S., Wanstead, Essex; R. D. DARBISHIRE, B.A., F.G.S., Manchester; W. E. HOYLE, M.A., F.R.S.E., Manchester; JOHN R. B. MASEFIELD, M.A., Cheadle, Staffordshire; JOHN H. PONSONBY, F.Z.S., London; B. B. WOODWARD, F.G.S., F.R.M.S., London.

Alteration of Rules.

On behalf of the Council, Mr. J. Cosmo Melvill proposed, and Mr. Lionel E. Adams seconded, a resolution to alter the wording of the 10th and 12th rules in order to permit of future annual meetings being held at a more climatologically convenient time of year than hitherto, and in order to facilitate, by holding these meetings successively in different parts of the country, the bringing together annually as numerous a body of members of the Society as is possible. The proposals were well discussed, the meeting being heartily in accord with the object aimed at, and eventually the motions were passed in the following form :—

(1) That Rule 10 be amended by the omission of the words 'in Leeds.'

(2) That Rule 12 be amended so as to read : 'The Annual Meeting shall be held at such time and place as may be fixed at the previous Annual Meeting, to receive the Reports and Balance Sheet of the outgoing Council, and to elect a Council and Officers for the ensuing year ;' and it was further resolved, on the motion of Mr. J. R. B. Masefield, M.A., seconded by Mr. Darbishire, that it be referred to the Council to fix the place and date of meeting for 1892 and to make all the necessary arrangements.

Vote of Thanks.

The best thanks of the Society were then voted to the authorities of the Owens College and to the Manchester Branch, its officers and members, for the kind reception which they had given to the Society, on the motion of Mr. Masefield.

New Members Elected :

Mr. Henry Ernest Craven, Matlock Bridge.

Mr. Arthur Trevelyan Daniel, M.A., Richmond Terrace, Stoke-on-Trent.

Mr. John Christopher Eccles, 20, Winckley Square, Preston.

Mr. Henry Hoyle Howorth, M.P., F.S.A., etc., Bentcliffe House, Eccles.

Candidates Proposed for Membership :

Mr. Joseph Henshall was proposed by Mr. E. Collier and seconded by Mr. R. Standen ; and Mr. Albert Gregory Alletsee, proposed by Mr. Wm. Moss and seconded by Mr. Robert Cairns.

The meeting was then adjourned for refreshments, which were provided in the Refectory of the Owens' College.

The meeting was resumed in the same room at 6-30 p.m.

The president, Rev. R. Boog Watson, B.A., F.R.S.E., F.L.S., then delivered the Annual Address, taking as his subject, 'The Relation of the Terrestrial and Freshwater Mollusca of the Madeiran Islands to those known Elsewhere' [printed at pp. 1—7 of this number].

At the conclusion of the address, a hearty vote of thanks to the President was moved by Mr. Edward Collier, seconded by Mr. Mark Stirrup, F.G.S., and carried unanimously.

The remainder of the evening was devoted to the exhibition of specimens, of which the following is a complete account :—

Exhibits :

By Mr. R. D. Darbshire : a large collection of land and freshwater shells from Lake Tanganyika; a series of *Nanina citrina* and *Nanina aulica* exhibiting much variation of colour and banding; a drawer of *Buccinum undatum*, including sinistral and many other abnormal varieties; and a number of very fine and perfect specimens of *Magilus antiquus*.

By Mr. L. E. Adams : *Buccinum undatum* from the Dogger Bank and Whitby, of enormous size.

By Mr. W. H. Heathcote : eight drawers of British marine shells, mostly collected along the Lancashire coasts, and including many rare species; and a number of Burmese and Indian Unionidæ.

By Mr. Henry Hyde : specimens of South African Achatinæ and a collection of *Terebra*.

By Mr. B. Sturges Dodd : an extensive and almost complete collection of British marine shells, especially rich in the smaller species and young forms, to the collection of which Mr. Dodd has paid particular attention.

By Mr. Edward Collier : four drawers of Cochlostylæ, Bulimi, Achatinellæ, and foreign Clausiliæ, showing many rare and extremely beautiful species of these families.

By Mr. Thomas Rogers : a collection of Achatinellæ and Auriculellæ from Sandwich Islands, and a drawer of foreign marine bivalves.

By Mr. Charles Oldham : *Helix arbustorum* var. *alpinula*, *H. hortensis* var. *incarnata*, and *Pisidium roseum* from Budworth and Baguley, Cheshire, and Rhos Neighr, Anglesea.

By Rev. H. Glanville Barnacle, M.A. : a collection of Careliæ and Achatinellæ from the Sandwich Islands, collected by himself, and including some rare and very handsome species.

By Mr. R. Cairns : a series of subfossil shells; and *Helix nemoralis* and *H. aspersa* from the Isle of Man, including a sinistral specimen of *H. aspersa*, which he collected at Peel in August last.

By Mr. Thomas Hey : a collection of Derbyshire land and freshwater shells, including many interesting varieties of *Helix nemoralis*, *H. hortensis*, *H. arbustorum*, and Unios.

Mr. Wm. Moss shewed his interesting collection of molluscan palates under the microscope, further illustrated by micro-photographs of most of them, prepared by Mr. W. H. Turner. He also had on view a series of micro-photographs, slides, and camera drawings illustrating a paper recently read before the Manchester Branch : 'On the Generative Organs of *Bulinus acutus*, with Descriptions of a Curious Shell-like body and its Appendages,' by Messrs. Standen and Hardy, which excited much attention amongst the members present. He also showed on behalf of Mrs. Heitland Unios from Burmah and shells from Loyalty Islands.

Mr. R. Standen showed a large collection of the smaller British land and freshwater species, showing his improved method of mounting in glass tubes, and exhibiting an extensive series of 'locality sets' from many parts of the kingdom, including all the British Bulimi, Pupæ, Vertigos, smaller Helices, and *Acme lineata* from many localities.

Mr. James Cosmo Melvill exhibited (A), a collection of *Cyclophorus*, containing about eighty species, among them being *C. aurantius*, *C. theobaldianus*, *C. siamensis*, *C. pearsoni*, *C. eximius*, *C. nilagiricus*, *C. oculus-capri*, *C. bensoni*, and other rare and beautiful species. Also (B), his collection of the genus *Latirus* and allies, in illustration of the 'Historical Account,' published in the last volume of the 'Memoirs and Proceedings of the Literary and Philosophical Society of Manchester.' Among them was one new species, in addition to the eleven recently described in his Paper. This ranks among the larger of the genus, allied to *L. concentricus* (Reeve), and it will shortly be described under the name *L. præstantior*. It formed part of Sir David Barclay's collection. (C), some types of *Mitra*, showing about forty unique or rare species, and also full series of *M. exasperata*, *Turricula regina*, and immediate allies, and *M. stigmataria*. In this latter, the gradations between *M. sanguisuga* on the one hand, and *M. granosa* on the other, were shown. Also *M. filosa* and *M. nexilis* with two extraordinary malformations, from Mauritius, collected by Sir David Barclay. (D), certain types of *Pecten*, including *P. sybille*, *P. hysginodes*, *P. loxoides*, *P. rubidus*, *P. roseopunctatus*, *P. cumingii*, and other beautiful forms. (E), a drawer of *Pupinida*, containing most of the described species of *Pupina*, *Pupinella*, *Registoma*, *Callia*, *Hargreavesia*, *Cataulus*, *Tomocyclos*, *Megalomastoma*, *Raphaulus*, and *Hybocistis*. (F), *Bembix argenteonitens* (Lischke), *Aluwina* (Lischke) from Japan, and *Turricula bairdii* (Dale) from 400 fathoms off coast of California—all very interesting Trochidae, found at abyssmal depths.

Mr. F. G. Pearcey showed *Buccinum finmarkensis* from Norway, also on behalf of Mr. David Robertson, F.L.S., F.G.S., of Millport, Cumbrae, a fine collection of *Solen siliqua* and varieties, including some of the largest known specimens, measuring $10\frac{1}{2}$ inches in length, and specimens of *Cyclops neriteus* taken on the coast of Scotland.

By Mr. F. C. Long: *Vertigo pusilla* from Silverdale, Lancashire.

By Mr. John Hardy, jun.: a case of carefully-prepared shell sections.

By Mr. J. Ray Hardy: selections from the collections of some of the early Manchester conchologists, mostly from localities now built upon or otherwise destroyed, and a collection of abnormal varieties, mostly British, including sinistral *Helix aspersa* and *H. nemoralis* from Lancashire, sinistral *H. nemoralis* from Bundoran, sinistral *Limnaea stagnalis* from Doncaster, scalariform *Planorbis spirorbis*, *P. complanatus*, *L. stagnalis*, and others, sinistral *H. pomatia*, and a sinistral *Gibbus lyonetianus* from the collection of Mr. E. Collier, together with many other curious abnormalities and examples of 'repaired' shells.

In the museum Mr. W. E. Hoyle specially pointed out a magnificent display of *Pecten*, *Hinnites*, and *Lima* from the museum and private sources

combined, a large case being devoted to British species, all of which were fully represented, a row of fine specimens of *P. opercularis* recently dredged off Fleetwood being especially noticeable. The foreign series is very complete and contains many rare and some unique types. The museum collection is in course of arrangement according to the latest authorities; a generic series is shown in the table-cases, with maps showing geographical distribution, and printed descriptions of generic characteristics. The arrangement is completed as far as Turbinella, and when finished the displayed collection will, it is hoped form a valuable conchological index to the whole molluscan genera. The remainder of the collection will be arranged for reference in drawers underneath the cases. Amongst other special objects pointed out were a series of specimens of wood bored by Teredo, a fine collection of North American Unionidæ, a case illustrative of the life-history of the British Zonites and Helices, with models of animals, darts, and the principal varieties, nests of *Lima hians* between dead valves of *Pecten maximus*, a case of enormous specimens of *Pinna nobilis* from Cannes, and an interesting chart of classification drawn out by Mr. Hoyle and illustrated by specimens, which is intended to serve as a key to the whole collection.—W.D.R.

ANNUAL REPORT.

THE Council, in presenting their Report for the year 1891, have to congratulate the members upon a year of uninterrupted and steady prosperity.

The Membership, which stood at 199 at the date of the last annual meeting, now amounts to 215, of which 10 are honorary life members, 12 are ordinary members resident abroad, and the remaining 193 ordinary members resident in the British Islands.

Twenty-three new members have been elected during the year, and one old member reinstated whose postal address had not been known for some years. Three members have resigned, and the Society has had the misfortune to lose four valued members by death. One of these was an ex-President—Mr. William Jeffery, of Ratham, near Chicester; another, Mr. Clifford Burkill, one of the most promising of our younger students of marine mollusca; and the other two, Mr. J. W. Wood, of Bedford, and Miss E. B. Fairbrass, of Faversham, Kent, were experienced and able conchologists of long standing. The net increase of 16 members is gratifying, and testifies to the confidence with which both the Society and the 'Journal of Conchology' are viewed by British conchologists.

Nine meetings have been held in Leeds since the last annual meeting, those of January and August not having been held on account of the vacation seasons.

A very large number of specimens of great interest have been exhibited at all of these meetings.

The following Papers have been read:—

Rev. R. Boog Watson, B.A., F.R.S.E.—‘The Marine Mollusca of Madeira.’
C. S. Bell Cox, B.A., and Edgar A. Smith, F.Z.S.—‘*Helix elegans* in East Kent, near Dover.’

Robert Standen—‘*Vertigo moulinsiana* in Dorsetshire.’

Hubert Elgar and Henry Lamb—‘List of Land and Freshwater Mollusca occurring in the Maidstone District.’

T. D. A. Cockerell—‘Note on *Limnæa peregra* var. *ovaliformis*.’

J. H. A. Jenner, F.E.S.—‘Notes on the Land and Freshwater Mollusca of East Sussex.’

Rev. John McMurtrie, M.A., D.D.—‘Egg Shells: Notes on the Land and Freshwater Shells of the Island of Eigg.’

A. E. Craven, F.Z.S., and Edgar A. Smith, F.Z.S.—‘Notes on the Viviparous Nature of *Balea*.’

John W. Taylor, F.L.S.—‘Note on *Helix arbustorum* var. *canigonensis* Boub. = *repellini*.’

‘Note on *Helix lapicida* var. *subangulata*.’

J. T. Marshall—‘The Habitat of *Montacuta ferruginosa*.’

J. Cosmo Melvill, M.A., F.L.S.—‘Descriptions of Eleven New Species belonging to the genera *Columbarium*, *Pisania*, *Minolia*, *Liotia*, and *Solarium*,’ with plate.

Rev. J. E. Somerville, B.D.—‘Note on *Achatina acicula* in a Roman Cemetery at Ventimiglia.’

Dr. Heinrich Simroth (hon. member)—‘Note on some Testacellæ.’

Most of these Papers have been duly printed in the ‘Journal of Conchology,’ and others await publication.

The usual four numbers of the ‘Journal of Conchology’ have been published during the year by its Editor, Mr. John W. Taylor, F.L.S., and copies have been issued to the members of the Society in accordance with the arrangements entered into with the Editor three years ago, which arrangements your Council recommend shall be continued.

The Society’s Collections, which are partly displayed in the Museum of the Leeds Philosophical Society and partly stored in three cabinets which are deposited at the same museum, have been considerably added to during the year. Several donations have been of great interest. The Society is indebted to Mr. J. H. Ponsonby for a large number of interesting shells, both marine and non-marine, from various parts of the world; to the Rev. Dr. McMurtrie for the full collection of shells of Eigg, sent in illustration of his paper; to Messrs. Hubert Elgar and Henry Lamb for the full collection of shells illustrating their List of Maidstone Land and Freshwater Mollusca; to Messrs. R. Nash, S. Elley, and L. E. Adams, for a set of the shells of the Penistone district; to Mr. J. C. Smith for shells from Banffshire; to Mrs. Brockbank for important additions to the Society’s series of British Marine Shells; to Mr. Hillman for a long series of the Helices of Sussex; to Mr. T. D. A. Cockerell (whom your Council have to congratulate on his recent appointment to the Museum Curatorship at Jamaica) for numerous valuable types; as well as to Rev. Carleton Greene, Mr. C. S.

Bell Cox, Mr. J. W. Storey, Mr. Albert Wood, Mr. R. Barnes, Mr. J. W. Taylor, F.L.S., Mr. E. R. Sykes, B.A., Mr. A. L. Reade, Mr. C. O. Pickard Cambridge, Rev. S. Spencer Pearce, M.A., Mr. C. H. Morris, Mr. A. H. Pawson, Rev. Herbert Milnes, Rev. R. A. Summerfield, B.A., Mr. J. Burt Davy, Mr. J. D. Butterell, Dr. R. F. Scharff, Rev. George Gordon, LL.D., etc., etc.

Your Council have pleasure in announcing that various much-appreciated Subscriptions have been made to the Cabinet Fund, and that a valued member—Mr. W. Whitwell—has placed the Society under much obligation, by offering to contribute 5/- for this purpose annually in addition to his subscription, in the hope that a considerable number of other members may follow his example.

Mr. Nelson, the Curator, has devoted a good deal of time and attention to the mounting and arrangement of the Collections and has finished the display of the British Marine series. There are, however, still a large number of the British species which the Society will be pleased to accept as donations from the members in order that the series may be completed. The Curator would also be pleased if the members would present collections of the shells of their own particular district or county; and your Council may take advantage of this present occasion of holding a Meeting in Manchester, to say that collections of shells from Cheshire, South Lancashire, and West Lancashire, would be greatly valued as donations from our Lancashire members.

The Library has increased during the year by numerous exchanges, and by donations of books, pamphlets, and reprints. Some very important additions have been made. Among the works purchased may be mentioned Rossmässler's *Iconographie*, a full set of the *Zeitschrift für Malakozoologie*, Müller's '*Vermium Historia*,' Leach's '*Synopsis*,' Reeve's '*British Mollusca*,' etc. The British Museum trustees have presented a set of their publications on Mollusca, and Mr. Charles Ashford a copy of Montagu's '*Testacea Britannica*.' Our President, Rev. R. Boog Watson, has laid the Society under great obligation by the gift of the whole of the series of works from his own pen, including his magnificent '*Challenger Report*' on *Gastropoda* and *Scaphopoda*, as well as by a handsome donation towards the cost of the purchase of Rossmässler. Our previous President, Mr. E. A. Smith, has also presented the whole of his reprinted Papers, and our Treasurer, Mr. Lionel E. Adams, B.A., a full series of reprinted Papers by his uncle, the celebrated Arthur Adams—while reprints and papers of various kinds have been given by Messrs. M. Cossmann, J. R. Bourguignat, B. B. Woodward, R. B. Newton, J. W. Taylor, Rudolph Bergh, W. Denison Roebuck, T. D. A. Cockerell, Thos. Scott, R. E. C. Stearns, C. D. Walcott, R. J. Lechmere Guppy, J. C. Melvill, J. H. Ponsonby, Rev. H. H. Higgins, R. F. Scharff, W. H. Dall, F. W. Wotton, W. Crouch, etc.

At the commencement of the year a complete catalogue of the Library was printed, thus rendering the books accessible to members generally who wish to avail themselves of the easy conditions upon which books may be borrowed. A moderate amount of use has been made of the Library in this

manner, and your Council trust that the Members will continue to avail themselves more and more of the privileges thus available.

The Librarianship has been vacant for the greater part of the year, the member who was appointed to this office at the last Annual Meeting having resigned and left Leeds. It gives your Council great pleasure to announce that a most suitable successor has been found in the person of Mr. Edgar R. Waite, F.L.S., whose position as curator of the Museum in which our Library is deposited, renders the appointment, should it be ratified by this Annual Meeting, a particularly appropriate one.

The sub-committee which was appointed at the last Annual Meeting for the purpose of preparing a new list of the Land and Freshwater Mollusca of the British Isles have reported that they have compiled a first draft, which is now under revision as to a few knotty points which have yet to be settled, and that they hope to have their list ready to print in an early number of the 'Journal,' together with a series of explanatory notes as to the reasons which have influenced them in regard to certain needed corrections of nomenclature, and as to the principles by which they are actuated in the treatment of the question as to the extent to which varieties are to be admitted.

Your Council have had under consideration the question as to the date at which the Annual Meetings are held, and have authorised certain propositions to be laid before you for such amendment of the rules as will enable future Annual Meetings to be held at such season of the year as may be found more suitable and more climatologically propitious for enabling members to attend at least one meeting of the Society yearly in larger numbers than it is possible to expect at ordinary meetings.

The Recorder reports that at the end of the fourteenth year during which the authentication system has been carried out the total number of Records made and vouched for stands at 31,405 records, representing an average number of 42 species for each of the 149 counties and vice-counties into which the British Islands are divided. A considerable and very satisfactory amount of attention has been paid to the completion of the Scottish census, while some little attention has been paid to Ireland, although the number of Irish records made falls very far short of what is desired. The four blank counties (Queen's, Carlow, Longford and Galway East), reported last year are still blank, no records whatever having been submitted from them. There are also various counties, eleven in number, from which the total number of species recorded has not yet reached ten each, viz. :—Radnorshire, Ebudes South, Shetlands, Cavan, Kildare, Wicklow, Kilkenny, Roscommon, Clare, Tipperary North, and Cork North; and it would be very desirable that attention should be particularly directed to these neglected areas, and our recorder and referees allowed to inspect the results. The most considerable additions made this year are a number of Flintshire shells sent by Rev. Thos. Shankland, of Mold, and of Dumfriesshire and other Lowland Scottish species submitted by Mr. Wm. Evans.

The Treasurer's Report, and that of the Manchester Branch, will be submitted to you separately.

Treasurer's Report.

In presenting the Annual Report of the finances of the Society I have to state, that while the Balance Sheet shows £2 10s. 3d. in hand, the October number of the Journal is not paid for, which will more than cancel the balance stated. The arrears of Subscriptions amount to the large total of £28 11s. 3d. If this amount could be collected there would be a considerable balance to the credit of the Society.—LIONEL E. ADAMS, Hon. Treasurer, Penistone, *December 11, 1891.*

BALANCE SHEET.

GENERAL FUND.

Receipts.	£	s.	d.	Payments.	£	s.	d.
Balance from last year ...	9	14	2	Rent of Room at Leeds			
Subscriptions received in				for 1890 ...	0	10	6
1891... ..	43	2	0	Gratuity to Porter at Leeds	0	10	0
Sale of Journals, &c. ...	1	6	5	Cost of Journals (not in-			
Bank Interest ...	0	1	5	cluding Oct. 1891)	24	12	6
				Secretary's Expenses ...	5	2	4
				Treasurer's ditto ...	2	4	8
				Stationery of Society ...	4	16	0
				Books Bought ...	13	17	4
				Balance in Hand ...	2	10	3
	<u>£54</u>	<u>4</u>	<u>0</u>		<u>£54</u>	<u>4</u>	<u>0</u>

CABINET FUND.

Receipts.	£	s.	d.	Payments.	£	s.	d.
Balance from last year	0	2	11½				
Sale of Tubes ...	0	3	3				
Donations received in				Nil			
1891 ...	2	6	6				
	<u>£2</u>	<u>12</u>	<u>8½</u>	Balance in Hand ...	<u>£2</u>	<u>12</u>	<u>8½</u>

LIONEL E. ADAMS.

Dec. 12th, 1891, audited and found correct,

WILLIAM MOSS, F.C.A.

ROBERT CAIRNS.

REPORT OF THE MANCHESTER BRANCH

DECEMBER 12TH, 1891.

MR. PRESIDENT AND GENTLEMEN,

I am pleased to be able to report that the Manchester Branch of this Society has during the year made steady progress, a number of good workers having joined. We have now thirty-two members, most of whom are already members of the parent society. Many of our recently-elected members have also joined the Society on entering the Branch.

The meetings have been held monthly throughout the year and have been well attended. Great interest has been shown in all subjects brought forward, and the exhibits have been very numerous, and often of special importance.

During the summer months excursions have been made to Marple, Cheshire; Lostock, Gralam, and Marston Forge, Cheshire; Lathkill Dale, Derbyshire; Dukinfield and the Peak Forest Canal; and to Clitheroe. These excursions have proved very interesting and agreeable to those taking part in them, and resulted in some good records being made.

The Council of Owens College have kindly granted the use of a room in the Museum for the members of the Branch, and we hope to place in the Museum a Local Collection of Land, Freshwater, and Marine Shells, contributed by members, and arranged in one of the Museum's cabinets, and available for reference by any conchologist upon application to the keeper. It is proposed that this collection shall be illustrative of the Molluscan Fauna of the Manchester district, and to include Lancashire, Cheshire, Derbyshire, and such portions of Yorkshire as may come within a reasonable radius.

Detailed reports of the various excursions, with lists of species collected, have been furnished by the Secretary, Mr. Standen; and the following Notes and Papers have been contributed by members during the year:—

By Edward Collier: 'On Marine Gasteropods being eaten by Thrushes during severe Winter Weather.'

By J. Cosmo Melvill: 'On the Genus *Laticus* and its Allies.'

By L. St. George Byne: 'On the occurrence of *Pleurobranchus membranaceus* in Teignmouth Bay.'

By W. E. Hoyle: 'A Description of a rare Cephalopod, *Illex eblanæ*, from Plymouth.'

By W. H. Heathcote: '*Testacella scutulum* in Lancashire.'

By R. Standen: 'Observations on the Reproduction of the Dart in *Helix aspersa*'; and 'Note of the Occurrence of *Vertigo pusilla* in Lancashire.'

By R. Standen and J. Ray Hardy: 'Observations on the Generative Organs of *Bulimus acutus* Müll., with Description of a remarkable Calcareous Organ connected therewith.'—ROBERT STANDEN, Honorary Secretary, Manchester Branch.

LIST OF MEMBERS.

(With year of election; O = founder, or original member; L = a Life Member
who has compounded for his subscription).

HONORARY MEMBERS

(Limited to ten in number).

- 1889. Bergh, Prof. Dr. Rud., Vestre Hospital, Stormgade, 19, 2, Copenhagen.
- 1889. Binney, Wm. G., 222, E. Union St., Burlington, New Jersey, U.S.A.
- 1886. Bourguignat, J. R., Officier d'Académie, Chevalier de la Légion
d'Honneur, Secrétaire Général de la Société Malacologique
de France, Rue Voltaire, 6, Saint Germain-en-Laye, Seine-
et-Oise, France.
- 1889. Cossmann, Maurice, Ingénieur-chef des services techniques du chemin
de fer du Nord, 95, Rue de Maubeuge, Paris.
- 1889. Crosse, Hippolyte, Rue Tronchet, 25, Paris.
- 1878. Kobelt, Dr. Wilhelm, Schwannheim, Frankfort-am-Main.
- 1886. Martens, Dr. Eduard von, C.M.Z.S., Paulstrasse, Berlin, N. W.
- 1889. Philippi, Dr. R. A., Director del Museo Nacional, Santiago, Chile.
- 1889. Sars, Prof. G. O., Universitat, Christiania, Norway.
- 1889. Simroth, Dr. Heinrich, Gohlis, Leipzig.

ORDINARY MEMBERS.

- 1891. Adams, Gerald Wheatley, M.R.C.S., L.R.C.P., Clifton, Ashbourne,
Derbyshire.
- 1885. Adams, Lionel Ernest, B.A., Rose Hill, Penistone, Yorkshire.
- 1889. Agius, Paul, B.A., 106, Strada Reale, Valletta, Malta.
- 1892. Alletsee, Albert Gregory, 1, South Villas, Kensington Road, Red-
land, Bristol.
- 1891. Ancey, César Felix, Membre de la Société Malacologique de France,
Member of Colorado Biological Association, Membre de la
'Societas Entomologica' de Zurich, etc., Administrateur-
Adjoint, Boghari, Algeria.
- 1888. Bailey, Rev. George, F.R.M.S., The Manse, Finchingfield, Essex.
- 1886. Baillie, William, Brora, near Golspie, Sutherlandshire.
- 1889. Baker, Arthur Edwin, 77, Conduit Street, Leicester.
- 1886. Barnacle, Rev. H. Glanville, M.A., F.R.A.S., The Vicarage,
Holmes Chapel, Crewe, R.S.O.
- 1887. Beaulah, John, Ravensthorpe, Brigg, Lincolnshire.
- 1891. Beckett, James Benjamin, 99, Clapham Road, Lowestoft.
- 1888. Bell, Alfred, 78, Wells Street, Oxford Street, London.
- 1886. Bendall, Wilfrid, 28, Gloucester Place, Portman Square, London, W.
- 1884. Bostock, Edwin D., The Radfords, Stone, Staffordshire.
- 1879. Brazier, John, F.L.S., C.M.Z.S., Curaçoa House, 82, Windmill
Street, Sydney, N.S.W.
- 1889. Brockbank, Maria (Mrs. E.), Bond End, Settle, Yorkshire.
- 1887. Brown, Alfred, 7, Bowmont Terrace, Glasgow.

1890. Burkill, Isaac Henry, Caius College, Cambridge.
 1888. Burrows, Thomas F., 4, Wellington Road, Newark-on-Trent.
 1879. Butterell, J. Darker, 4, Willow Grove, Westwood, Beverley.
 1888. Byne, Loftus St. George, 5, Sea View Terrace, Teignmouth, Devon.
 1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne.
 1878. Cash, William, F.L.S., F.G.S., F.R.M.S., 38, Elmfield Terrace, Halifax.
 1892. Champ, Henry, c/o Messrs. S. & J. Watts & Co., Portland Street, Manchester.
 1887. Chaytor, R. C., Scafton Lodge Middleham, Bedale, Yorkshire.
 1889. Christy, Robert Miller, F.L.S., Maltese Road, Chelmsford, Essex.
 1886. Coates, Henry, F.R.P.S., Pitcullen House, Perth.
 1885. Cockerell, T. D. A., F.Z.S., F.E.S., Institute of Jamaica, Kingston, Jamaica, W.I.
 1880. Collier, Edwd., 1, Heather Bank, Moss Lane East, Oxford Road, Manchester.
 1887. Cooke, Rev. Alfred Hands, M.A., F.L.S., King's College, Cambridge.
 1886. Coulson, Frank, 6, Montague Terrace, Kelvinside, Glasgow.
 1888. Cox, Chas. Stanley Bell, B.A., M.R.C.S., San Remo, Chelston, Torquay.
 1886. Craven, Alfred E., F.G.S., F.L.S., F.Z.S., 65, St. George's Road, Warwick Square, London, S.W.
 1892. Craven, Henry Ernest, Matlock Bridge, Derbyshire.
 1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
 1889. Crawshaw, Rev. Charles, Wesley Villa, Saltburn-by-the-Sea.
 1886. Crick, Walter D., 7, Alfred Street, Northampton.
 1888. Crouch, Walter, F.Z.S., Grafton House, Wellesley Road, Wanstead, Essex.
 1879. Cundall, J. W., 21, Elgin Park, Redland, Bristol.
 1886. DaCosta, Solomon J., 2, Craven Hill, London.
 1888. Dale, Henry F., A.A., B.Sc., F.R.G.S., F.R.M.S., F.Z.S., F.E.S., etc., Post Office, Estabrook, Park Co., Colorado, U.S.A.
 1888. Dale, (Mrs.) Violet, P.O., Estabrook, Park County, Colorado, U.S.A.
 1888. Dale, (Miss) A. M., Hatherley, Bampfylde Rd., Torquay, Devonshire.
 1892. Daniel, Arthur Trevelyan, M.A., Richmond Terr., Stoke-on-Trent.
 1886. Darbshire, Robert D., B.A., F.G.S., Victoria Park, Manchester.
 1878. Davis, James William, F.S.A., F.L.S., F.G.S., Chevinedge, Halifax.
 1889. Dawson, Oswald, 93, Shakespeare Road, Herne Hill, London, S.E.
 1891. Dawson, Robert Southworth, Belmont, Shipley, Yorkshire.
 1888. Dewick, Rev. Edward S., M.A., 26, Oxford Square, London, W.
 1886. Dodd, B. Sturges, 67, Beech Avenue, New Basford, Nottingham.
 1886. Duncan, W., 31, Mill Lane, Montrose, Forfarshire, N.B.
 1892. Eccles, John Christopher, 20, Winckley Square, Preston.
 1891. Elgar, Hubert, 18a, Tunbridge Road, Maidstone, Kent.

1884. Elliot, Edward J., High Street, Stroud, Gloucestershire.
 1888. Evans, (Mrs.) A., sen., Brimscombe Court, Thrupp, near Stroud.
 1886. Eyre, Rev. W. L. W., M.A., Swarraton Rectory, Alresford, Hants.
 1889. Falloon, (Mrs.) Beatrice J., Long Ashton Vicarage, Clifton, Bristol.
 1891. Farrer, Captain Wm. James, Orange Court House, Virginia, U.S.A.
 1890. Fierke, Frederick Wm., 52, Francis Street West, Hull.
 1887. Fitzgerald, Francis R., F.S.Sc., 26, Great Percy Street, Pentonville, London, W.C.
 1884. Fitzgerald, H. Purefoy, North Hall, Preston Candover, Hants.
 1886. Fitzgerald, (Mrs.) J., 10, West Terrace, Folkestone, Kent.
 1888. Fortune, Riley, F.Z.S., Ravensgill, Franklin Mount, Harrogate.
 1892. Fulton, Hugh, 89, Fulham Road, London, S.W.
 1886. Gain, Wm. Albert, Tuxford, Newark, Notts.
 1887. Galizia, Joseph Sylvester, 64, Piazza Celsi, Valletta, Malta.
 1889. Gaskell, Roger, M.A., 5, The Grove, Highgate, London, N.
 1887. Gatto, Alfred Caruana, B.A., 59, Strada Levante, Valletta, Malta.
 1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., etc., Accrington, Lancashire.
 1886. Godlee, Theo., Whips Cross, Walthamstow, Essex.
 1887. Gordon, Rev. George, LL.D., Braeburnie, Elgin, N.B.
 1886. Greene, Rev. Carleton, M.A., Great Barford Vicarage, St. Neots.
 1890. Grocock, Leonard Oakley, 21, Beckenham Road, Penge, London.
 1890. Gude, G. K., 5, Giesbach Road, Upper Holloway, London, N.
 1886. Gwatkin, Rev. Prof. H. M., M.A., 8, Scrope Terrace, Cambridge.
 1891. Hadow, Gerald Elliot, South Cerney Vicarage, Cirencester.
 1886. Hagger, John, F.L.S., Repton School, Burton-on-Trent.
 1888. Halstead, John, J., 19, Millholme Terrace, Carlisle.
 1887. Hanley, Sylvanus, F.L.S., Hanley Road, Hornsey Road, London, N.
 1887. Hargreaves, J. A., 40, Ramskill Road, Scarborough, Yorkshire.
 1889. Hartley, Alfred, 8, Cavendish Road, Idle, near Bradford, Yorkshire.
 1887. Harvard, T. Mawson, Green Bank, Lingard Road, Lewisham, London, S.E.
 1891. Hawell, Rev. John, M.A., Vicarage, Ingleby Greenhow, Middlesbrough.
 1891. Hawes, Alfred, Penistone, Yorkshire.
 1887. Heathcote, Wm. Henry, 54, Frenchwood Street, Preston.
 1889. Hedworth, Thos. II., 1, Railway Terr., Dunston, Gateshead-on-Tyne.
 1888. Heitland, (Mrs.) M., The Priory, Shrewsbury.
 1892. Henshall, Joseph, Ivy Cottage, Barton-on-Irwell, near Manchester.
 1878. Hepburn, Frederick, B.A., Sutton, Surrey.
 1887. Hey, Thomas, Bloomfield Street, Derby.
 1886. Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1886. Hockin, (Miss) S., Phillack Rectory, Hayle, Cornwall.
 1888. Hodgson, (Mrs.) Julia, Chalgrave Vicarage, Leighton Buzzard, Beds.
 1886. Holmes, W. J. O., F.L.S., Strumpshaw Hall, Norwich.
 1891. Horsley, Rev. J. W., Holy Trinity Vicarage, Woolwich.
 1890. Howard, James, 21, Burnt-Ash Road, Lee, London, S.E.
 1884. Howell, G. O., 3, Ripon Villas, Ripon Rd., Plumstead, London, E.C.

1892. Howorth, Henry Hoyle, M.P., F.S.A., etc., Bentcliffe House, Eccles, Manchester.
1886. Hoyle, W. E., M.A., M.R.C.S., F.R.S.E., Keeper of the Manchester Museum, Owens College, Manchester.
1883. Hudson, Baker, Public Library, Middlesbrough-on-Tees.
1886. James, John H., A.R.I.Cornwall, 3, Truro Veau Terracé, Truro, Cornwall.
1886. Jenkins, A. J., 6, Douglas Terrace, Douglas Street, Deptford, London, S.E.
1891. Jenner, James Herbert Augustus, F.E.S., 4, East Street, Lewes.
1888. Jones, (Miss) Laura C., 5, Alexandra Road, Clifton, Bristol.
1888. Jones, Wm. Jas., jun., 27, Mayton Street, Holloway, London, N.
1889. Jordan, H. K., F.G.S., The Knoll, Clytha Park, Newport, Monmouthshire.
1887. Kew, H. Wallis, F.E.S., 5, Giesbach Road, Upper Holloway, London, N.
1889. Knight, G. A. Frank, M.A., Rosenlauri, Bearsden, Glasgow.
1891. Lamb, Henry, Lime Villas, Bower Street, Maidstone, Kent.
1879. Laver, Henry, M.R.C.S., F.L.S., Trinity Street, Colchester, Essex.
1892. Layard, Edgar Leopold, C.M.G., F.Z.S., etc., Otterbourne, Budleigh, Salterton, South Devon.
1878. Leicester, Alfred, 1, Priory Gardens, Weld Rd., Birkdale, Southport.
1886. Lightwood, James T., Hope House, Lytham, Lancashire.
1889. Linter, (Miss) J. E., Arragon Close, Twickenham, Middlesex.
1886. Lowe, Edward Joseph, D.L., J.P., F.R.S., F.L.S., F.G.S., F.R.A.S., etc., Shirenewton Hall, Chepstow, Monmouthshire.
1887. Luther, S. M., Garrettsville, Ohio, U.S.A.
1891. Lyons, Lady, Kilbrough, Swansea, Glamorganshire.
1889. MacAndrews, James J., Lukesland, Ivy Bridge, Devonshire.
1885. McKean, Kenneth, F.L.S., Lloyds, London, E.C.
1886. McMurtrie, Rev. John, M.A., D.D., 14, Inverleith Row, Edinburgh.
1884. Madison, James, 167, Bradford Street, Birmingham.
1885. Marquand, Ernest D., Fermain House, Guernsey.
1887. Marshall, J. T., Sevenoaks, Torquay, Devonshire.
1889. Martin, Sydney Trice, Hanover Chambers, King Street, Manchester.
1887. Masefield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
1888. Mason, Philip Brooke, J.P., M.R.C.S., F.L.S., F.Z.S., Horninglow Street, Burton-on-Trent.
1889. Mayfield, Arthur, 88, Stafford Street, Norwich.
1887. Mellors, George W., Locksley House, Sherwood Rise, Nottingham.
1880. Melvill, James Cosmo, M.A., F.L.S., Kersal Cottage, Prestwich, Manchester.
1891. Middleton, Robert, Gledhow, near Leeds.
1888. Milne, J. Grafton, Albert Square, Bowdon, Cheshire.
1879. Milnes, Rev. Herbert, M.A., Winster Vicarage, near Derby.
1891. Mitchell, James, 37, Darnley Street, Pollokshields, Glasgow.
1886. Morgan, J. Bickerton, 30, Severn Street, Welshpool.

1891. Morris, Cecil Herbert, Lewes, Sussex.
1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
O Nelson, William, Crossgates, near Leeds.
1887. Newstead, A. H. L., B.A. Cantab., Roseacre, Epping.
1891. Newton, Richard Bullen, F.G.S., Nat. Hist. Museum, South Kensington, London, W.
1890. Nicholson, John, Chapeltown, Pudsey, Yorkshire.
1891. Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., F.L.S., etc.,
Burnmoor Rectory, Fence Houses, Durham.
1887. North, S. W., M.R.C.S., F.G.S., Micklegate, York.
1887. Oldham, Charles, Ashlands, Ashton-on-Mersey, Cheshire.
1889. Paling, Albert, B.A., B.Sc., Middlesex Hospital, London.
1882. Parke, George H., F.L.S., F.G.S., St. John's, Wakefield.
1887. Parry, Lieut-Col. G. S., 18, Hyde Gardens, Eastbourne, Sussex.
1888. Peal, Charles Nathaniel, F.L.S., F.R.M.S., Fernhurst, Mattock Lane, Ealing, London, W.
1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock, Oxfordshire.
1890. Pickard-Cambridge, C. Owen, Bloxworth, Wareham, Dorsetshire.
1886. Pidgeon, Daniel, Ass.M.Inst.C.E., F.G.S.
1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
1885. Quilter, Henry E., 34, Sparkenhoe Street, Leicester.
1888. Radcliffe, John, 111, Oxford Street, Ashton-under-Lyne.
1886. Ramage, John, 20, Hill Street, Dundee, Forfarshire, N.B.
1887. Reader, Thomas W., F.G.S., 171, Hemingford Road, Barnsbury, London, N.
1885. Redding, J. Roland, 31, Belvedere Road, Dublin.
1887. Renton, Robert, Fans Road, Greenlaw, Berwickshire, N.B.
1888. Rhodes, Frederick, 13, Moorside Terrace, Moorside Road, Eccleshill, Bradford, Yorkshire.
1888. Robertson, David, F.L.S., F.G.S., Fernbank, Millport, Great Cumbrae, N.B.
1892. Robinson, Charles, 29, Stretford Road, Manchester.
O Roebuck, Wm. Denison, F.L.S., Sunny Bank, Leeds.
1886. Rogers, Thomas, 27, Oldham Road, Manchester.
1892. Russell, James,
1886. Saunders, Edw., F.L.S., St. Ann's, Mount Hermon, Woking, Surrey.
1877. Scharff, Robert F., Ph.D., B.Sc., M.R.I.A., Natural History Museum, Dublin.
1886. Selater, A. J. R., Bank Street, Teignmouth, Devonshire.
1886. Scott, Thomas, F.L.S., 14, Lorne Street, Leith, N.B.
1887. Shaw, Alexander, 439, St. Vincent Street, Glasgow.
1886. Shrubsole, George Wm., Town Hall Square, Chester.
1889. Siggs, F. L., B.A., Middlesex Hospital, London.
1884. Skilton, (Mrs.) Mary, 21, London Road, Brentford, Middlesex.
1886. Smart, Rev. R. W. J., M.A., Parkham Rectory, Bideham, N. Devon.
1886. Smith, Edgar A., F.Z.S., Nat. History Museum, South Kensington, London, W.

1886. Smout, Charles L., 40, Braybrooke Road, Hastings, Sussex.
 1889. Smyth, Thomas P., J.P.
 1886. *Z* Somerville, Alexander, B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow.
 1887. Somerville, Rev. James E., M.A., B.D., 11, Southpark Terrace, Hillhead, Glasgow.
 1886. Sowerby, Geo. Brettingham, F.L.S., 121, Fulham Rd., London, S.W.
 1886. Standen, Robert, 40, Palmerston Street, Moss Side, Manchester.
 1888. Stanley, Frederick, 'Rokeby,' Edgar Road, Margate, Kent.
 1886. Steel, James, (Glass Stainer), 104, Renfrew Street, Glasgow.
 1888. Stirrup, Mark, F.G.S., High Thorn, Bowdon, near Manchester.
 1888. Storrs, Rev. George Godwyn, B.A., 13, Granada Road, Southsea.
 1885. Storey, J. A., B.A., St. Joseph's, High School, Cardiff.
 1890. Stubbs, Arthur Goodwin, Sherwood Rise, Nottingham.
 1888. Sykes, Ernest Ruthven, B.A., 9, Belvedere, Weymouth, Dorsetshire.
 1886. Taylor, (Miss) Helen L., Woodside, Rowditch, Derby.
 1887. Taylor, J. M., Free Museum, Paisley, Renfrewshire, N.B.
 O Taylor, John W., F.L.S., Outwood Villa, Horsforth, Leeds.
 1886. Tomlin, J. R. Brockton, B.A., 59, Liverpool Road, Chester.
 1886. Turner, Rev. William, 5, St. Andrew's Square, Edinburgh.
 1880. Tye, G. Sherriff, 10, Richmond Road, Handsworth, Birmingham.
 1886. Viner, C. W., M.A., Ph.D., 9, Seymour Street, Bath.
 1891. Waite, Edgar R., F.L.S., Curator of the Leeds Museum; Huddersley, Leeds.
 1890. Warren, (Miss) Amy, Moyview, Ballina, Co. Mayo, Ireland.
 1891. Walker, Bryant, 18, Moffat Building, Detroit, Michigan, U.S.A.
 1885. Waters, A. H., B.A., Willoughby House, Mill Road, Cambridge.
 1886. Watson, Rev. Robert Boog, B.A., F.R.S.E., F.L.S., Free Church Manse, Cardross, Dumbartonshire.
 1888. Whatmore, Charles A., Much Marcle, Herefordshire.
 1886. Whitwell, Wm., 4, Thurleigh Road, Balham, London, S.W.
 1889. Williams, John M., 4, Exchange Alley, Liverpool.
 1891. Williamson, Rev. Charles Arthur, M.A., Paradise Villa, Longwood, Huddersfield.
 1890. Wood, Albert, Wyndley, Sutton Coldfield, Warwickshire.
 1886. *Z* Woodward, Bernard B., F.G.S., F.R.M.S., 131, The Grove, Ealing, London, W.
 1886. Wotton, F. W., 11, Moira Terrace, Cardiff, Glamorganshire.

***Helix aspersa* Müll. monst. sinistrorsum** Taylor in the Isle of Man.—At the September meeting of the Manchester Branch, Mr. R. Cairns showed a very fine example of this monstrosity, which he had taken from a wall at Peel, Isle of Man.—R. STANDEN, *November 16th, 1891.*

NOTES ON THE MARINE MOLLUSCA OF THE
NORTH WALES COAST,
WITH COMPLETE LISTS OF THE RECORDED
NUDIBRANCHS AND CEPHALOPODS.

J. R. BROCKTON TOMLIN, B.A.

(Read before the Conchological Society).

A LIST of the Marine Shells of North Wales, by the Rev. Carleton Greene, was published last March in the first number of 'The Conchologist,' taking the Mawddach estuary as a southern limit. The species he catalogues are exclusively littoral, with the exception of a few records from Jeffreys' 'British Conchology'; and in the following notes I shall mostly confine myself to the same zone, but shall add a few interesting finds from the shores of the Dovey estuary—a locality some twelve miles south of the above-mentioned limit. As many are aware, the Liverpool Marine Biological Committee include the strictly North Wales coast (i.e., as far as Anglesey and Carnarvon Bay) in their sphere, and will shortly publish, for the first time, a complete record of the conchological results of their collecting and dredging operations, which extend to the Isle of Man. I believe the total number of Mollusca hitherto placed on their records (which I have had the privilege of studying) is 217.

Omitting the Jeffreysian citations, the most interesting species which Mr. Greene has noted are as follows:—*Axinus flexuosus* Poli (Portmadoc), *Venus chione* L. (Barmouth), *V. casina* L. (Barmouth), *Tellina pusilla* Ph. (Barmouth or Mochras), *Lutraria oblonga* Ch. (Harlech), *Capulus hungaricus* L. (Barmouth), *Lamellaria perspicua* L., *Scaphander* (Penmaenmawr). In a few cases there is an obvious misidentification of

species. For instance, *Cylichna alba* Brown is a deep-water rarity from the Shetlands, and cannot occur at Barmouth. *Donax trunculus* L., again, is recorded from four localities, whilst *D. vittatus* L. is queried from one. As *D. trunculus* is only admitted by Jeffreys into the British list on the strength of two Devonshire specimens, we may safely refer all the Welsh records to *D. vittatus* L. (= *anatinus* Lam.). A good deal of confusion originated with Forbes and Hanley, who included both *vittatus* and *trunculus* in their *D. anatinus*. Possibly Mr. Greene's doubtful record should read *D. politus*. We may also be allowed to doubt the correct allocation of *Pecten varius* var. *nivea* Macg., an exclusively northern form, very different from the ordinary white *varius* and sometimes considered a distinct species: and of *Chiton albus* L. The following are nearly all supplementary to Mr. Greene's list, and, except where otherwise specified, of littoral occurrence. Records initialled 'F.A.' are on the authority of Mr. F. Archer, of Liverpool:—

Anomia ehippium var. **squamula** L.—Common on roots of *Laminaria* wherever washed up.

Pecten pusio L.—Valves at Penmaenmawr. Alive, Carnarvon Bay (F.A.).

Modiolaria discors L.—Occurs commonly at the roots of *Laminaria* and *Corallina* passim, from Barmouth to Criccieth.

Lepton squamosum Mtg.—Anglesea (Jeff.) Valves are not uncommon all over the area of the Liverpool Marine Biological Committee.

Montacuta bidentata Mtg.—I found a perfect specimen among some drift from Rhyl.

Cardium nodosum Turt.—Dead at Bull Bay, Anglesea (F.A.).

Venus fasciata DaC.—Formerly rather plentiful at Llandudno. I have not taken it there for several years now.

Venus ovata Penn.—Bull Bay (F.A.), generally dead.

Tapes pullastra var. **perforans** Mtg.—Odd specimens alive at Llandudno, Barmouth, and Criccieth.

Tellina donacina L.—Occasional valves at Bull Bay and elsewhere in Anglesea (F.A.).

Tellina fabula Gron.—This shell is often fine and plentiful at Abergele and Pensarn, with large numbers of *Ceratisolen legumen* L.; and a small var. of *Macra subtruncata* L.

Psammobia ferroensis Ch. is quite a characteristic shell of the province, being recorded from Colwyn Bay, Barmouth, Penmaenmawr, Portmadoc (Greene), and not uncommon at Aberdovey.

Scrobicularia alba Wood.—Very common at Bull Bay, Tynyngogl, etc. (F.A.), Rhyl, Abergele, and Towyn.

Solen pellucidus Penn.—Dredged all over their area by the L.M.B.C., and found abundantly on the shore at Red-wharf Bay and at Bull Bay (F.A.).

Mya binghami Turt.—Bull Bay (F.A.), Criccieth.

Chiton fascicularis L.—I have taken this at Llandudno.

Helcion pellucidum var. **lævis** Jeff. may be taken in its well-known habitat at the base of *Laminaria* stems wherever this plant is washed up.

Tectura testudinalis Müll. has been taken alive near Colwyn Bay. A live specimen thence is in the collection of the Grosvenor Museum, Chester.

Tectura virginea Müll.—Llandudno.

Trochus zizyphinus L.—I have collected magnificent specimens of this shell at low-water of a spring tide off Rhos Point between Llandulas and Old Colwyn. They were very large, beautifully coloured, and not at all uncommon, very conspicuous objects on the rocks as they crawled over them without concealment. One of the largest specimens belonged to the very distinct var. *lævigata* Jeff., marked by its absolute smoothness and a broadening of the basal

whorl that suggests the contour of *Trochus granulatus*. I have seen specimens of this variety and of the type that were dredged in the Menai Straits, as well as a fine example of the subscalariform monstrosity mentioned by Jeffreys. The var. *lyonsii* Leach has been taken alive at Bull Bay by Mr. Archer.

Trochus montacuti Wood.—One dead shell at Dulas Bay (F.A.).

Lacuna divaricata Fab.—Enormous specimens live on the *Laminaria* beds at Llandudno, which are every now and then laid bare by a low tide round the pier. Both this and *L. pallidula* DaC. are plentiful there, if assiduously searched for; but *L. puteolus* Turt. is very scarce. The light orange-coloured variety of *L. pallidula* is not rare.

Rissoa violacea Desm.—Dead at Barmouth.

Rissoa costata Ad.—In Rhyl drift.

Rissoa semistriata Mtg.—Living at Puffin Island (F.A.).

Hydrobia ulvæ Penn.—Swarming in myriads on the muddy flats between Mochras and the mainland; also very large ones near Amlwch.

Jeffreysia diaphana Jeff.—Very plentiful at Porthwen in Anglesea on weeds (F.A.).

Skenea planorbis Fab.—Llandrillo (F.A.).

Aclis supranitida Wood.—Several fine specimens from the Dovey estuary. Jeffreys' record of this and *Aclis unica* Mtg. from Barmouth seems to have escaped Mr. Greene's notice.

Purpura lapillus L.—A comparatively gigantic variety lives on mud in the Conway estuary at extremely low tides, while from Llandudno I have three very long narrow shells and several curious monstrosities. The McAndrew Collection (in the Cambridge Museum of Comparative Anatomy) contains a grand series of the genuine var. *imbricata* Lam., which is frilled almost like the Californian

Venus gnidia Brod. They were dredged on an oyster-bed in a few fathoms in Rhoscolyn Bay, south of Holyhead.

Trophon muricatus Mtg.—One at Bull Bay (F.A.).

Trophon truncatus Str.—Alive at Bull Bay (F.A.).

Fusus antiquus var. **alba** Jeff.—This gigantic form occurs off Anglesea, but though I have it thence I cannot specify exact locality.

Fusus propinquus Alder. —Thrown up at Llandulas (F.A.).

Actæon tornatilis L.—A specimen from the Dovey measures an inch in length. The var. *subulata* Wood also occurs there.

A few records of the Nudibranchs and Cephalopods that have been collected on the coast hitherto may prove interesting. The list is complete as far as I can ascertain. Hilbre Island, at the mouth of the Dee and just outside the limits, is very rich in the Nudibranchiata and produces several great rarities. The letter 'L' appended to the following Records denotes that they are cited from Reports I. and II. of the Liverpool Marine Biological Committee, published in 1886 and 1889.

NUDIBRANCHIATA.

Fiona marina Forsk. (= **nobilis** A. & H.).—Two specimens at Penmaenmawr (L.).

Eolis papillosa L.—Llandulas; Llandudno.

Eolis glauca A. & H.—Dredged off Beaumaris (A. & H.).

Eolis coronata Fbs.—Puffin Island (L.).

Eolis drummondi Thomp.—Menai Straits (A. & H.).

Eolis gracilis A. & H.—Menai Straits (A. & H.); one specimen off Puffin Island in 11—13 fathoms (L.).

Eolis arenicola Fbs.—Menai Straits (Forbes).

Eolis viridis Fbs.—One specimen at Puffin Island (L.).

Eolis nana A. & H.—Puffin Island (L.).

Eolis picta A. & H.—Menai Straits (Forbes); off Redwharf Bay (L.).

Eolis tricolor Fbs.—Off Anglesea (Forbes).

Eolis despecta Johnst.—Bangor (A. & H.).

Eolis exigua A. & H.—With the preceding (A. & H.).

Antiopa cristata D.Ch.—Menai Straits (A. & H.).

Doto coronata Gmel.—Off north coast of Anglesea (L.); Puffin Island (L.).

Doto fragilis Fbs.—Dredged off Puffin Island (L.).

Dendronotus arborescens Müll.—Off the Great Orme's Head in 7—8 fathoms (L.).

Tritonia plebeia Johnst.—Puffin Island (L.).

Polycera ocellata (A. & H.).—Puffin Island (L.).

Goniodoris nodosa Mtg.—Puffin Island (L.); Rhos Point and Llandudno, not uncommon.

Doris tuberculata Cuv.—Generally common, Llandudno, Puffin Island, Llandulas, etc.

Doris aspera A. & H.—Llandudno, Rhos Point; not mentioned in the L. reports; identified for me by Canon A. M. Norman.

Doris proxima A. & H.—Puffin Island (L.).

Doris bilamellata L.—In great numbers at Llandudno in spring, during the spawning time (March to May).

Doris pilosa Müll.—Puffin Island (L.); Colwyn Bay (specimens in Grosvenor Museum, Chester).

CEPHALOPODA.

Loligo media L.—Menai Straits; Penmaenmawr; off Llandudno (L.).

Loligo vulgaris L.—Menai Straits (L.).

Rossia macrosoma D.Ch.—Rhyl; Bagillt; Redwharf Bay (L.).

Sepia officinalis L.—Shells occasionally drifted up all along the coast.

Sepia biserialis De Mont.—Cymmeran Bay, Anglesea, shells only (L.).

Eledone cirrosa Lam.—Occasionally at Llandudno near the pier. Also recorded from Puffin Island and Colwyn Bay (L.).

Sepiola atlantica d'Orb.—Menai Straits: Puffin Island (L.).

P.S.—The Rev. H. Milnes writes as follows:—"The Pecten taken at Barmouth was the *ordinary* white var. of *varius*: *Cylichna alba* of ours really = *C. cylindracea* Penn. . . . *Chiton albus* must be wrong; it is some years since I was at Barmouth, and I cannot just now find any notes of my visit, nor any specimen of *Ch. albus* from Barmouth in my collection. I am very glad you wrote to me about them, as it is a sad thing when errors get stereotyped."

Arion minimus=intermedius Norm.—The slug introduced to the British fauna by Dr. Scharff as *Arion minimus* Simroth, is probably a perfectly valid species, but it appears to be identical with the earlier described *A. intermedius* Normand (1852). It is the *A. flavus* of my 'British Naturalists' Catalogue of Land and Freshwater Mollusca,' p. 7 (1890). In 1885 I found an example at Kingsley, Staffordshire, and described it as *A. flavus* in 'Science Gossip,' Oct. 1885, p. 224. In this latter place some confusion is apparent owing to the fact that the passage from 'I have recently found' to 'central line of the mantle,' was written as a footnote, but printed in the body of the text. I meant to imply that Mr. Sutton's form was the dubious form (really *subfuscus*) referred to earlier, and did not wish to connect it in any way with my *A. flavus* (really *intermedius*). *A. intermedius* has been recently re-described, and the synonymy given by Pollonera (1890).—T. D. A. COCKERELL, December 12, 1890.

LIST OF MOLLUSCA FOUND AT MEIRINGEN,
SWITZERLAND.

BY REV. J. W. HORSLEY, M.A.

HAVING spent a month in this beautiful place and excellent centre for expeditions in the Bernese Oberland, it may be useful to other visitors who are conchologists if I record what terrestrial mollusca are to be found there. It is not a very good locality, but Dr. Studer of the Musée d'Histoire Naturelle at Berne kindly furnished me with a list of the species hitherto recorded from Meiringen and the Haslithal. They were *Zonites cellarius*, *Helix rudrata*, *H. rotundata*, *H. obvoluta*, *H. personata*, *H. arbustorum* (and var. *alpicola*), *H. lapicida*, *H. nemoralis*, *H. hortensis*, *H. sylvatica* (and var. *alpicola*), *H. rupestris*, *H. fruticum* (and var. *fasciata*), *H. incarnata*, *H. sericea*, *H. hispida*, *H. villosa*, *H. ericetorum* var. *minor*, *Bulimus montanus*, *B. obscurus*, *B. detritus*, *Cochlicopa lubrica*, *Clausilia laminata*, *Cl. parvula*, *Cl. minima*, *Cl. gracilis*, *Cl. dubia*, *Cl. plicatula*, *Cl. ventricosa*, *Pupa avenacea*, *P. secale*. In addition to these I found *Zonites fulvus* and *Z. crystallinus*, *Helix pulchella*, *H. pomatia*, *Carychium minimum*, *Succinea putris*, *Vertigo minutissima*, *V. alpestris*, and *V. angustior*. As bearing on the question of the non-identity of *Helix nemoralis* and *H. hortensis*, I may say that while the latter was fairly common, the former was only to be found in one hotel garden, no doubt introduced with shrubs. *Helix fruticum* at a first glance is almost indistinguishable from *H. hortensis* var. *lutea* until the deep umbilicus is noticed, but on extricating the animal it is found that the shell is white and pellucid, and the bright yellow colour comes entirely from the body of the mollusc. What other instances of this are there? I would gladly exchange some of these Swiss shells for foreign *Helices* from any country.

OBSERVATIONS ON THE REPRODUCTION OF
THE DART, DURING AN
ATTEMPT TO BREED FROM A SINISTRAL
HELIX ASPERSA Müll.

By R. STANDEN.

(Read before the Manchester Branch, Nov. 12th, 1891).

A SERIES of attempts to procure fruitful pairing of the sinistral *Helix aspersa* taken at Whalley during the Society's visit there in June, 1889, with a dextral specimen, although unsuccessful so far as the hoped for breeding of a sinistral progeny was concerned, resulted in the noting of a number of exceedingly interesting observations relating to use and reproduction of the Helecine dart. I kept the snail in a deep dish, half-filled with soil, pieces of decayed wood, and lumps of chalk, and covered with a bell-glass, through which its habits could readily be watched.

The following notes from my journal were made at the time, and I have given them verbatim:—

Feb. 14, 1890.—Placed with the sinistral snail a fine healthy 'virgin' dextral specimen reared from the egg by Mr. Rogers.

Feb. 16.—Noticed signs of desire to pair in both; genital organ protruded and swollen, and snails fondling each other with their tentacles.

Feb. 17.—Both snails very active, crawling over and round each other. Repeatedly saw each protrude the dart and prick the other with the point, which was on such occasions exerted about $\frac{1}{8}$ inch. The animal thus pricked would suddenly withdraw into its shell, but instantly reappear and eagerly approach the other. Coition evidently difficult owing to genital aperture being on reverse side in sinistral one. Both constantly approach head to

head in the usual manner, but will have to be side by side before coition can properly take place.

Feb. 18.—Snails must have been very active during the night, the glass being covered with mucus slime. Darts of both found lying detached on a piece of leaf, entangled in thick mass of yellow slime. Darts perfectly formed, unbroken, and have come cleanly away from annulus.

During the next three days snails very sluggish, refusing food, and apparently suffering from effects of loss of darts. Afterwards they began feeding voraciously, and ate quantities of chalk—so much that their excrement consisted chiefly of chalky pellets. Separated snails, and looked expectantly for eggs.

March 7.—No sign of eggs, so put snails together again. In a short time notice genital aperture begin to enlarge and swell, and symptoms of desire to pair.

March 8.—Snails very active all day, love-making.

March 9.—Extremely active all day, making repeated attempts to pair. In the evening find a perfect dart lying free in the slime on glass.

March 10.—Find another dart sticking in a piece of lettuce leaf. About a millimetre of point showing on other side of leaf. Dart perfect.

For four days after this, both torpid again, refusing food, and hanging from top of glass, looking so feeble that it seems as if weight of shell would cause them to fall.

March 14.—Both feeding and eating much chalk. Dextral snail began burrowing in soil towards evening.

March 15.—Dextral snail has excavated a deep hole and almost disappeared from view. Hope it is laying eggs.

March 16.—Shell come out of hole. Look carefully for eggs, but find none. Late at night find snails extremely active, with signs of pairing.

March 17.—Snails busy love-making all day.

March 18.—Watched them closely for three hours in early morning, and am delighted to find that the animals have evidently recognised uselessness of their former method of approach, for now they press together side by side, and genital orifices are in contact repeatedly. Darts frequently used. At intervals they remain quiescent, fondling each other with tentacles and palpi, and then resume their active and very remarkable movements. After one particularly violent stab from the dextral snail's dart, which evidently pierced deeply, the other retreated entirely into its shell, and exuded a quantity of mucus. By this sudden movement the dart of the dextral snail was dragged out of the sac until the annulus was visible. The snail then began a series of very violent efforts to withdraw the dart into the sac by muscular contraction, but this proving ineffectual, it deliberately turned its head, and, seizing the point of the dart with its mouth, tried to push it downwards. This it continued to do unceasingly for twenty minutes, and finally succeeded in getting the dart back into the sac. Both were quiet for some hours after this, but again resumed their love-making in the afternoon, and late in the evening I found their darts lying side by side on the glass.

Both snails again inert, and declined to feed for three days.

March 22.—Both again active, and eating chalk and lettuce alternately, but taking no notice of each other.

March 27.—Took out the dextral snail, and replaced it by another taken from a hedgerow at Meols.

March 28.—Again find love-making going on.

During the next two days snails very active, but the fresh one will persist in meeting the other head to head in normal manner, which seems to irritate the other.

April 1.—This morning I find two darts on the glass. Do not think the pair have been actually in contact, but they

have shown great excitement, constantly crawling over each other and repeatedly using darts.

April 2.—Both show signs of exhaustion.

April 4.—Snails feeding quietly, mostly eating chalk.

April 5.—Find them again actively attempting to pair; sinistral one especially eager, but dextral snail obstinately approaches head to head all the time I watch.

April 7.—This morning find pair of darts lying free on a leaf. Both are perfect and unbroken. Snails quiet and not feeding.

April 14.—Snails quite recovered from last attempt to pair, but do not notice each other. Take out the Meols snail and again put in the former one, which the other appears to recognise.

April 17.—This morning find snails pairing. In the evening notice that a dart has pierced quite through the fleshy part of the sinistral one's foot, and is evidently causing the animal much uneasiness. Another dart—presumably that from the sinistral one—was sticking to side of glass. Examined this carefully, but could see no difference to others.

April 18.—The dart still troubling the sinistral snail, so withdraw it with forceps, unbroken. It was embedded quite half its length in the foot, about mid-way between the head and tail of the animal, and had gone completely through, the point being about $\frac{1}{8}$ inch out, projecting upwards towards the shell and slanting in the direction of the animal's head, which would seem to indicate its having been thrust into the position it occupied by the other snail, and not picked up by accident during the act of crawling. This time I have noticed more hopeful signs of actual coition than hitherto; the genital organs pressed closely together and merged in each other, remaining thus for from ten to fifteen minutes at a time.

May 2.—During past fortnight both snails have often been in the burrow, sometimes remaining there a whole day. They have fed greedily, and eaten remarkable quantities of chalk, but I find no eggs as yet.

May 11.—This morning find snails pairing as actively as ever. In the evening find pair of darts on side of glass, and snails showing usual symptoms.

May 18.—Snails for several days been in and out of burrow frequently, but am losing faith in their actions, having been so often disappointed !

May 22.—Pairing going on as usual, and, later, find two more darts detached.

May 30.—Take out the dextral snail.

June 2.—Find about a dozen very thin-shelled eggs in bottom of burrow, but by which laid do not know, as I did not examine when I removed dextral one. Eggs do not look promising, but hope for some result at last.

This was my last entry. No young resulted, and I had to give up hopes of rearing a sinistral brood; the eggs speedily shrivelled up, being evidently abortive. The dextral snail produced no eggs, and though I placed the snails together, after a few weeks' isolation, they made no further attempt to pair.

Early in October the sinistral snail showed signs of drooping, its body becoming flaccid and much discoloured. I had its photo. taken, whilst crawling on a piece of glass, by Mr. Hoyle, and we then noticed that its body was full of some kind of larvæ, feeding—ichneumon-like—without touching a vital part. The snail continued to take a little food until its death about ten days later, and the larvæ then came out and at once pupated. They were curious woodlouse-like creatures, and when the perfect insects emerged from the pupa they were identified by Mr. J. Ray Hardy as one of the Diptera—*Drosophila cellarius* Linné, a generally-common little fly, often found in cellars, feeding upon decayed bones, cloth, worms, grease,

Boleti, and growth upon beer and wine casks, etc. Mr. Hardy has preserved all the specimens, which number fifty-seven.

Thus, although the attempt to rear a brood of sinistral *Helices* failed, the notes I was able to make are of considerable interest as showing how rapidly a new dart may be formed to replace a lost one, which loss must often occur in a state of nature, judging from the violent use made of this weapon. The exceptional circumstances under which my observations were made must, of course, seldom have a parallel in nature; sinistral individuals of a normally dextral species being so rare, and the great expenditure of darts I have recorded would hardly be likely to occur between two individuals of like form, whether dextral or sinistral. It is rather singular that in spite of my close watching for hours together, and seeing the dart so often used, I never saw the dart actually dragged away from the animals and detached. The nearest approach was in the instance I have noted where the animal pushed it back into the sac.

The short time required to renew the dart is remarkable, six days being the shortest period I have noted. The eleven pairs of darts produced by my snails were all of full size, perfectly formed, with not one abnormal one amongst them, and all very much alike. Probably this may be accounted for by the ready access which the animals had to the soft chalk, of which they ate enormous quantities. Respecting the functions of the dart itself, I cannot assign any other use to it than the inducement of sexual excitement prior to coition, as I have described, and with this reason most naturalists nowadays agree.



***Helix rotundata* var. *alba* at Conisborough.**—At Conisborough the other day I found eight specimens of *H. rotundata* var. *alba*. Two under stones round the castle, and six in the woods at the 'Cliff.' Most of the typical *rotundata* were very light coloured.—LIONEL E. ADAMS, Penistone, July 9, 1891.

NEW VARIETIES OF AMERICAN MOLLUSCA.

BY T. D. A. COCKERELL, F.Z.S., F.E.S.,Curator of the Museum of the Institute of Jamaica.

Helix thyroides var. nov. **pulchella**. Max. diam. $20\frac{1}{2}$ mill., thin, translucent, rather shiny, transverse grooves regular and distinct, lip well formed but delicate, parietal tooth subobsolete; colour, pale horn, tinged with vinous, especially near the aperture.

This pretty variety was sent to me by Mr. D. B. Cockerell, who found it very common at Toronto, Canada. It has somewhat the same relation to *thyroides* that *galloprovincialis* has to *cantiana*.

Pupa blandi forma nov. **obtusa**. $2\frac{1}{2}$ mill. long, broader in proportion to its length than the type. Near the Micawber Mine, Custer County, Colorado.

Pascal has described a somewhat similar form of *marginata* proper (*blandi* being a subspecies or var. of *marginata*) as *obtusa*.

Succinea avara var. nov. **compacta**. A form with a whitish shell, much incrustated with dirt, a large body-whorl, and a very short spire, resembling in outline *S. stretchiana*, with which it was formerly doubtfully identified.

I found this variety by Chalk Creek, Chaffee County, Colorado. It requires further investigation and may prove a new species. It certainly is not allied to *stretchiana*, but belongs with *avara*.

Succinea lineata forma nov. **elongata**. Length 13, aperture length 7, spire length 6 mill. Kremmling, Colorado. The ordinary form, also from Kremmling, measures 11 mill. long, aperture 7, spire 4 mill. long.

ON THE VIVIPAROUS NATURE OF *BALEA*.

BY THOS. ROGERS.

IT may be interesting to the readers of the 'Journal of Conchology' to have a few additional notes besides those which appear in the 'Journal' for October, 1891, by A. E. Craven and Edgar A. Smith on the viviparous nature of *Balea perversa*. During the latter part of August, 1869, I was in the neighbourhood of Killarney with a small party of botanists, and as I was the only one of the party having conchological proclivities, I had to do my snail hunting before my fellow botanists had arisen. It was during one of these early morning walks near the Torc Waterfall, and whilst the rain was coming freely down that I fell in with a numerous colony of *Balea perversa* on a wall that was streaming with rain and the drip of trees. They were fine long specimens of a greenish horn colour, and I noticed that a large number of them had young shells in the mouth of the adult shells, exactly as described by Mr. Craven in his find in the Duchy of Luxemburg, October 1890. You will probably remember, Mr. Editor, seeing these Killarney specimens with the young *in situ* when you favoured me with an inspection of my cabinet. At the time of my visit to Killarney I was in correspondence with Dr. Gwyn Jeffreys, and amongst other things I mentioned the fact and observations as aforementioned about *Balea*. In a paragraph of a subsequent letter dated September 20, 1869, he says, "Your account of the viviparous nature of *Balea perversa* is interesting." The inference I drew from this remark was that the observation was new to him or not generally known.

I have collected *Balea perversa* many times in various places, but I never saw it in this apparent viviparous condition, except in the Killarney specimens, although I think my friend Mr. Moss has found similar specimens and in similar condition

in the Isle of Man. My Killarney specimens were found, as I said before, on a dripping wet wall in a downpour of rain. It is curious to know that another wall-loving mollusc, *Helix rupestris*, was found by Mr. Collier in a similar viviparous condition. It would be interesting to know whether Mr. Craven found his specimen on a wet wall or during wet weather. I suppose it would be 'stretching a point' in the 'scientific use of the imagination' to infer that the young molluscs had sought refuge in their mother's house to prevent themselves from being washed away or drowned, or that the mothers had taken charge of the young after the fashion of the ant when danger was in evidence. The remarks made by Mr. Craven and Mr. Edgar Smith are full of interesting issues which can only be worked out and substantiated by the diligent and observant conchologist.

Sinistral *Helix aspersa* at Bristol.—Last Monday, Feb. 8, 1892, I took a walk through fields on the outskirts of Paddy's Lane. Close to a stream there very fine *Limnæa peregra* locates. I found the remains of a very large reversed *Helix aspersa*. The winter had made some hungry feathered friend find and feed on a costly meal. The shell is remarkably coloured—the bands almost black and evenly situated. I searched the hedge, but could find no more. This broken *Helix aspersa* is the third reversed shell of this species I have taken near Paddy's Lane.—F. M. HELE.

***Limnæa stagnalis* L. monst. sinistrorsum.**—Mr. J. Ray Hardy exhibited a nice specimen of this monstrosity at the April meeting of the Manchester Branch, which he had obtained along with the collection of the late Thomas Morley, of Manchester. It is immature, and about one inch in length, and was labelled, 'Drain near Doncaster, 1860.'—R. STANDEN.

ACHATINA ACICULA IN A ROMAN CEMETERY
AT VENTIMIGLIA, ITALIAN RIVIERA.

BY REV. J. E. SOMERVILLE, M.A., B.D.

(Read before the Conchological Society)

Ventimiglia is the frontier town of the Italian Riviera. It dates back to the remote past. Through it ran the Via Julia Augusta (still traceable for long distances) by which Roman legions and all the traffic between Italy and Gaul for centuries passed. Hannibal and his troops came this way, and indeed the route is one that has been followed for ages, as far back indeed as those of prehistoric man. Of Roman remains there are many in the neighbourhood. Roman milestones form pillars and even the bases of fonts in its churches. About a mile to the east the benches of a theatre may be seen peeping out from the sand, the rest being buried beneath a macaroni manufactory. Hard by is a Roman cemetery, the tombs of which were discovered by a man while digging his vegetable garden. Since then very many objects have been unearthed from the graves. Rude pieces of pottery and the more elegant Samian ware are plentiful as well as articles of glass, patarae, jars, cups, large vases containing bones, and an abundance of lachrymatories and what appears to be little bottles for unguents or perfumes. Nearly all are of blue-green glass, some, however, are yellow and some red, but all show the opalescent hue from the decomposition of the surface, while some appear to have had the interior gilded. One of these little bottles, of an elegant globular form, had stood in my room for some months just as it had come from the ground. One day, fearing the weight of earth it contained might occasion damage, I carefully removed some of the dry hardened earth. Among the particles I noticed some

small white things. These on examination proved to be *Achatina acicula*. On further emptying the earth, more appeared, and still more; until when I had finished I counted no fewer than one hundred and thirty specimens, all of which had come out of one small bottle, two inches in height and one-and-a-half inches in diameter. They were various sizes, some full grown, others young. It was interesting to find this comparatively scarce species, not only in such abundance, but in such a very remarkable place. The mollusc is semi-subterranean, but a few inches are usually the limit of depth to which it penetrates. The lachrymatories and bottles were taken from a depth of from ten to twelve feet. The graves were, originally of course in the ground, but they have long been covered over with several feet of drifted sand, enough to bury out of sight the adjoining theatre.

The questions naturally arise how and when did these little snails gain access to the bottle? what induced them to enter the trap which to them became a real cinerary urn?

The shells are quite fresh and glassy in appearance, but in all probability have lain many centuries in their resting place. The soil is sandy and very dry, and would long preserve anything buried in it. The bottle in which they were found appears to have been used for unguents. Can it be that when the cork decayed the contents proved attractive to the mollusc? I searched the contents of some lachrymatories of the ordinary form without finding any shells.

On mentioning my discovery to M. Bonfils, curator of the Mentone Museum, he informed me that the species is sometimes found at the roots of salad plants, but that he had also found it in the interior of earthenware pots from the Roman tombs.



Pupa ringens in Guernsey.—It is interesting to record the occurrence of this northern species so far south as Guernsey. I first found it here in some abundance at Moulin Huet three years ago, and since then I have taken specimens from time to time in various other localities on the south coast of the island. My first impression was that it had been introduced, either intentionally or accidentally, but its comparatively wide distribution favors the belief that *Pupa ringens* is truly indigenous to Guernsey. Its usual habitat is at the roots of umbelliferous and other plants close to running water, low down the valleys; but it also occurs among mosses at the head of one of the cliff rivulets at an elevation of three hundred feet above the sea.—E. D. MARQUAND, Fermain, Guernsey, *January 6th, 1892* (read before the *Conchological Society, 2nd March, 1892*).

Zonites glaber var. viridula=viridans.—Mr. L. E. Adams, 'Journal of Conchology,' 1890, p. 265, has proposed the name *viridula* for the greenish variety of *Z. glaber*. It is, however, identical with my var. *viridans*, described in 'Science Gossip,' 1885, p. 226, the latter name, of course, having priority.—T. D. A. COCKERELL, *December 12, 1890*.

Helix virgata monst. sinistrorsum.—I have to record the taking of a live, half-grown specimen of this variety near St. Sampsons, Guernsey, in August 1891. It was crawling up a grass stem in company with others of the usual form. The ground round was carefully searched, but no more were to be found.—E. R. SYKES, Weymouth, *October 7th, 1891* (read before the *Conchological Society, 2nd March, 1892*).

Helix virgata Da Costa monst. sinistrorsum Taylor from Colwyn Bay.—Mr. J. Ray Hardy took a fine example of this monstrosity at Colwyn Bay during a visit in September last, and showed it, along with a scalariform specimen from the same place, at the October meeting of the Manchester Branch.—R. STANDEN, *November 16th, 1891*.

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

PROCEEDINGS.

194th MEETING, WEDNESDAY, NOVEMBER 4th, 1891.

Held at the Philosophical Hall, Park Row, Leeds.

Mr. John W. Taylor, F.L.S., Vice-President, in the Chair.

Candidates Proposed for Membership:

Messrs. Henry Ernest Craven (proposed by J. W. Taylor and W. Nelson); Arthur Trevelyan Daniel (by J. R. B. Masefield and L. E. Adams); John Christopher Eccles (by W. H. Heathcote and John W. Taylor); and Henry H. Howorth, M.P., F.S.A. (by J. C. Melvill and R. D. Darbshire).

Donations to Library announced and thanks voted: From the respective Editors, Authors, and Societies—The Naturalist for November, 1891; Feuille des Jeunes Naturalistes for September and November, 1891; L'Echange Revue Linneenne for May and October; Abstract Proceedings of Linnean Society of New South Wales for July 29, August 26, and September 30, 1891; Records of the Australian Museum, Vol. I, No. 8, July 1891; W. Crouch's List of the Land and Fresh Water Mollusca of Wanstead, Essex; and T. D. A. Cockerell on the Geographical Distribution of Slugs.

Donations to Collection announced and thanks voted:

From Dr. R. F. Scharff: several fossil *Helix nemoralis* from Roundstone, co. Galway.

From Rev. Geo. Gordon, LL.D.: several *Helix hortensis* var. *lutea*, of various band-formulæ, sent by Capt. Dunbar Brander of Pitgaveny, near Elgin.

Exhibits:

On behalf of Dr. Scharff were shown the examples of *Helix nemoralis* presented to the Society's collection, with a note that Mr. R. D. Darbshire believes that the richly calcareous quality of the soil at Roundstone may have tended to the formation of the heavy shells which are there found, that he (Dr. Scharff) had, however, collected recent specimens living on the same calcareous soil which exhibited no thickening whatever of the shell, so that this reason appeared to him to be insufficient to account for the production of the heaviness of the shell. Dr. Scharff in his note asked for opinions on the point. He mentioned also that Mr. Latham, of Manchester, ground down a number of these shells and found that after eliminating the sand, etc., there still remained a very large quantity of pure carbonate of lime (he forgets the exact figure) soluble in muriatic acid (see Proc. Lit. & Phil. Soc. Manchester, vol. 4, 1865).

On behalf of Mr. Robert Cairns were exhibited a var. of *Bulimus obscurus* and the var. *fulva* of *Helix caperata*, both from Clifton, *B. acutus* var. *inflata*, from Peel, Isle of Man, and *Planorbis contortus* var. *alba*, from Marple, Cheshire.

On behalf of Mr. J. B. Crane were shown *Helix ericetorum*, *Zonites cellarius*, *Bulimus obscurus*, and *Cyclostoma*, from Ventnor, Isle of Wight, where they are all extremely common, except the first-named.

On behalf of Mr. G. K. Gude were exhibited a large number of shells, including *Unio pictorum* and *Anodonta cygnea* from the Lea Marshes at Tottenham, Middlesex; *Planorbis carinatus*, *Sphaerium corneum*, *Ancylus lacustris*, *Limnaea stagnalis*, and *L. truncatula*, collected by Mr. H. W. Kew in a pond at Finchley, Middlesex; a number of *L. peregra* from the basins of the two fountains in Trafalgar Square, London; *L. stagnalis*, *L. peregra*, *Planorbis nautilus*, *Ancylus lacustris*, *Sphaerium corneum*, and *Pisidium obtusale*, collected by Mr. J. Burt Davy in a pond at Rigsby, near Alford (Linc. N.); *L. peregra*, *Sphaerium lacustre*, *S. corneum*, *Planorbis nitidus*, and *Pisidium fontinale*, collected by Messrs. J. B. Davy and E. Woodthorpe in ponds at Tothby, near Alford, Linc. N.

On behalf of Mr. Arthur Mayfield was shown a variety of *Neritina fluviatilis*, tinted with pink, from Heigham, near Norwich.

The Recorder exhibited in the flesh a specimen of *Mya truncata* sent by Mr. Wm. Ellis, fish merchant, Scarborough, which had been got in a trawl net fifty miles E.N.E. from that place.

196th MEETING, WEDNESDAY, FEBRUARY 24th, 1892.

Held at Sovereign Street, Leeds.

Mr. J. W. Taylor, F.L.S., Vice-President, in the Chair.

New Members Elected :

Mr. Albert Gregory Alletsee, 1, South Villas, Kensington Road, Redland, Bristol.

Mr. Joseph Henshall, Ivy Cottage, Barton-on-Irwell, Manchester.

Candidates Proposed for Membership :

Messrs. Henry Champ (proposed by Edward Collier and Robert Standen); Hugh Fulton (by Edgar A. Smith, F.Z.S. and J. Cosmo Melvill, M.A., F.L.S.); Edgar Leopold Layard, C.M.G., F.Z.S. (by G. K. Gude and Miss J. E. Linter); and Charles Robinson (by E. Collier and R. Standen).

The remainder of the business was postponed.

197th MEETING, WEDNESDAY, MARCH 2nd, 1892.

Held at the Philosophical Hall, Park Row, Leeds.

Mr. John W. Taylor, F.L.S., Vice-President in the Chair.

New Members Elected :

Mr. Henry Champ, c/o. Messrs. S. & J. Watts & Co., Portland Street, Manchester.

Mr. Hugh Fulton, 89, Fulham Road, London, S.W.

Mr. Edgar Leopold Layard, C.M.G., F.Z.S., etc., Otterbourne, Budleigh Salterton, South Devon.

Mr. Charles Robinson, 29, Stretford Road, Manchester.

Donations to Library announced and thanks voted: From the respective Editors, Societies, and Trustees: *Feuille des Jeunes Naturalistes* for January and February, 1892; *Catalogue de la Bibliothèque*, fasc. 13; *L'Echange Revue Linneenne*, December, 1891; the *Naturalist* for January, February, and March, 1892; *Journal of New Jersey Nat. Hist. Society*, Vol. II., No. 2; *Transactions of the Yorkshire Naturalists' Union*, part 16; *Proceedings of the Linnean Society of New South Wales*, 2nd series, Vol. VI., part I; Abstract of ditto, November 25, 1891; note In Memory of Sir William Macleay; and Report of Trustees of Australian Museum for 1890.

From the Respective Authors: *Catalogue of the Land and Freshwater Shells* hitherto recorded as found in Suffolk, by Rev. Carleton Greene; *New Clausilæ* from Malta, by A. Caruana Gatto; and *List of Shells collected on the West Coast of South America, &c.*, by Dr. W. H. Jones, by R. E. C. Stearns.

Donations to Collections announced and thanks voted:
From Mr. E. D. Marquand: *Pupa ringens* from Guernsey.

Papers Read:

A paper entitled 'Notès on the Marine Mollusca of the North Wales Coast, with complete Lists of the recorded Nudibranchs and Cephalopods,' by Mr. J. R. Brockton Tomlin, B.A. [printed in 'J. of C.,' January, 1892, pp. 25—31].

A short Note on *Helix virgata* m. *sinistrorsum* by Mr. E. Ruthven Sykes, B.A. [printed at p. 44].

A short Note on *Pupa ringens* in Guernsey, by Mr. E. D. Marquand, [printed at p. 44]. —

198th MEETING, WEDNESDAY, APRIL 6th, 1892.

Held at the Philosophical Hall, Park Row, Leeds.

Mr. John W. Taylor, F.L.S., Vice-President, in the Chair.

Donations to Library announced and thanks voted: From the respective Editors and Societies: *Feuille des Jeunes Naturalistes* for March and April, 1892; and *Catalogue de la Bibliothèque*, fasc. 14; *L'Echange Revue Linneenne*, February and March, 1892; *Naturalist* for April; *Natural Science* for April; Abstract *Proceedings of Linnean Society of New South Wales*, January 27 and February 24, 1892; and three Hand-Books of the Manchester Museum, viz.: *Descriptive Catalogue of the Embryological Models*, *General Guide to the Contents of the Museum*, and *Outline Classification of the Animal Kingdom*.

Donations to Collections announced and thanks voted:

From Mr. Charles Ashford: *Helix aspersa*, *H. hortensis* var. *incarnata* ooooo, *lutea* 12345 and *lutea* (123)45, *H. rufescens*, and *H. pulchella* from Blandford, Dorset; *Amalia gagates* var. *plumbea*, and *Succinea elegans* (name certain), from Spettisbury, Dorset; and *Sphærium lacustre* from a ditch, Christchurch, the last-named being an addition to the Christchurch list.

From Mr. Edward Self: A fine example of *Testacella haliotidea* found in an orchid-house at Ferniehurst, Shipley, about the end of March.

From Mr. Arthur Mayfield: *Helix caperata* var. *lutescens* from near Norwich.

Donations to Cabinet Fund

announced and thanks voted :

Mrs. A. Evans	...	...	...	...	...	5/-.
Mrs. Julia Hodgson	...	...	...	...	...	5/-.
Mr. Wilfrid Bendall	...	...	...	...	...	5/-.
Mr. Henry Champ	...	...	...	...	...	5/-.
Mr. Henry Coates, F.R.P.S.	...	...	...	...	...	5/-.
Mr. J. R. B. Masefield, M.A.	...	...	...	...	...	5/-.
Lieut.-Col. G. S. Parry	...	...	...	...	...	5/-.
Mr. David Robertson, F.L.S.	...	...	...	...	...	5/-.
Mr. William Whitwell	...	...	...	...	...	5/-.

Exhibits :

The Chairman showed a fine example of *Geomalacus maculosus* from County Kerry ; *Helix hortensis* var. *lutea* 12345, 00000, 12345 *arenicola* and 02300 *arenicola* from Greystones, County Wicklow ; *Testacella haliotidea* sent by Rev. J. W. Horsley from his own garden at Woolwich ; and some very peculiar examples from Ewell near Dover of *Helix arbustorum*, almost destitute of the usual markings, some referable to var. *canigonensis*, and one to var. *luteofasciata*, sent by Mr. L. E. Adams.

On behalf of the Rev. S. Spencer Pearce, M.A., were exhibited a large number of shells to illustrate a paper upon the Land and Freshwater Mollusca of Norfolk which he has in preparation.

On behalf of Mr. J. C. Eccles were shown some examples of *Acme lineata*, including one of var. *alba*, from copses near Ventnor, Isle of Wight, being a new record for that island, and an example of *Achatina acicula* also from Ventnor.

On behalf of Mr. E. R. Sykes, B.A. were shown numerous shells in illustration of his forthcoming list of Dorsetshire Land and Freshwater Mollusca, including *Sphærium lacustre* and *Limnæa stagnalis* from Almer, *Pisidium amnicum* from Bere Regis, *Neritina fluviatilis* and var. *trifasciata* from Chamberlayne's, Bere Regis ; *Valvata piscinalis*, *Vertigo pygmæa*, *Limnæa truncatula*, and *Planorbis corneus* from Weymouth ; *Acme lineata*, *Zua lubrica*, *Helix sericea*, *Limnæa truncatula* var. *minor*, and *Zonites radiatulus* from Bloxworth ; *Helix pulchella* and two varieties of *H. hortensis* from Portland ; *H. caperata* var. aff. *ornata* from Rodwell ; *Limnæa palustris* (and a distorted example) and *Planorbis spirorbis* from Winterbourne Selston ; *Planorbis carinatus* and var. *disciformis* from Morden Park ; *Zonites excavatus* var. *vitrina* from Morden ; and *H. hortensis* var. *lutea* 12345 *arenicola* from Osmington near Weymouth.

THE CONCHOLOGICAL SOCIETY'S LIST OF
BRITISH LAND AND FRESHWATER MOLLUSCA,
1892.

The Committee (consisting of Messrs. William Nelson, Wm. Denison Roebuck, and John W. Taylor) appointed to prepare a new edition of this List, have been guided in the execution of their task by the desire to make as little change as possible, consistent with the necessity of bringing the list up to the level of our present knowledge of the subject, and they have therefore considered it their duty to make only such changes in the nomenclature as they had personally satisfied themselves as to the necessity of, while in cases where there existed conflict of authority as to the desirability of change, no alteration has been made, pending the agreement of the conflicting authorities, or the opportunity for personal investigation of the original works.

EXPLANATIONS.

Arrangement:—The artificial separation of the land from the fresh water species has been discontinued, and a more natural arrangement adopted, as showing in a more striking manner the inter-relationship of the different genera.

Nomenclature:—This has been carefully examined, and revised where necessary.

The Authorities for Specific Names have been carefully revised, and the practice of enclosing them within parentheses has been adopted in the case of species which were originally described as of a different genus to that now used: e.g., *Arion ater* (L.) was described as a *Limax*, while *Helix hispida* L. retains its original generic allocation.

Square Brackets [] are used to denote species whose claim to rank as British is not yet thoroughly established, as in the case of *Hyalinia petronella*.

Monstrosities, although of no very great importance, are included in the list, placed after the varieties of each species,

and distinguished by 'm.' instead of 'v.' preceding the name. Under this denomination are included all abnormal forms, reversed, scalariform, decollated, or distorted.

The Exclusions from the list are *C. parvula* and *C. solida*, neither of which has the slightest claim to rank as British, and *Arion flavus*, which is a myth. *Helix hybrida* Poiret also disappears from the list, discarded on account of the confusion which the use of the name entails. For the future it will be more precise to refer specimens to the var. 'roseolabiata' or 'fuscolabiata' of *H. nemoralis* or *H. hortensis*, as the case may be.

Band-variation in *Helix nemoralis* and *H. hortensis*.—No philosophical plan of treating the numerous variations of these species has yet been propounded, and until such is the case it is deemed the wiser plan to include in the list only variations of size, form, texture, colour of lip and ground-colour. A convenient method or formula, however, exists by which band-variations may be readily and accurately recorded. As all conchologists know, the type form has five bands, each of which is constant in its position on the shell, three of them being always above, and two always below, the periphery. The variation is usually by suppression or by coalescence of one or more of these bands, or both. Numbering the bands for convenience 1, 2, 3, 4, 5, the uppermost being the first, and the lowermost the fifth band, the formula for the type would be written thus: 12345. In the case of the suppression of a band, a cypher (0) is used in lieu of its number, thus—12045—signifying that the third band is deficient. The unicolorous form is a case of the suppression of the entire series of bands, and for this the formula is five cyphers, thus—00000. In the case of coalescence of one or more bands, the numbers standing for the coalesced bands are enclosed within parentheses, e.g.—(12)3(45), which signifies that the first and second bands are fused together, also the fourth and fifth, the third only being free. Any combination of these formulæ may be used, as for instance, (12)305 signifies the coalescence of the first and second, and the suppression of the fourth. The black specimens afford an instance of the coalescence of all five bands, for which the formula is written thus—(12345).

THE CONCHOLOGICAL SOCIETY'S LIST OF
BRITISH LAND AND FRESHWATER MOLLUSCA, 1892.

CLASS CEPHALA.

SUB-CLASS GASTROPODA.

ORDER INOPERCULATA.

SUB-ORDER PULMONATA.

FAMILY ARIONIDÆ.

GENUS ARION *Fér.*

- Arion ater* (*L.*).
 v. rufa (*L.*).
 v. brunnea *Rbk.*
 v. plumbea *Rbk.*
 v. reticulata *Rbk.*
 v. bicolor *Rbk.*
 v. swammerdamii *Kal.*
 v. albolateralis *Rbk.*
 v. alba (*L.*).
Arion subfuscus *Drap.*
 v. aurantiaca *Loc.*
 v. brunnea *Lehm.*
Arion minimus *Simroth.*
Arion hortensis *Fér.*
 v. rufescens *Moq.*
 v. subfusca *C. Pfr.*
 v. nigra *Moq.*
Arion circumscriptus *Johnst.*
 (= *Arion bourguignati* *Mab.*)
 v. subfusca *Rbk.*

GENUS GEOMALACUS *Allman.**Geomalacus maculosus* *Allman.*

FAMILY LIMACIDÆ.

GENUS AMALIA *Moq.*

- Amalia gagates* (*Drap.*).
 v. plumbea *Moq.*
 v. rava *Wlms.*
Amalia sowerbyi (*Fér.*).
 (= *L. marginatus* *Jeffer.*).
 v. nigrescens *Rbk.*

GENUS LIMAX *L.*

- Limax maximus* *L.*
 v. cinerea *Moq.*
 v. ferrussaci *Moq.*
 v. krynickii *Kal.*
 (= *v. johnstoni* *Moq.*).
 v. lilacina *Rbk.*

- v. fasciata* *Moq.*
v. pallido-dorsalis *Huds.*
v. maculata *Pic.*
v. rufescens *Moq.*
v. cellaria *D'Arg.*
v. mülleri *Moq.*

Limax cinereo-niger *Wolf.*

- v. luctuosa* *Moq.*
v. ornata *Less.*
v. maura *Held.*

[*Limax tenellus* *Nilss.*]*Limax flavus* *L.*

- v. virescens* *Moq.*
v. colubrina *Pini.*
v. suffusa *Rbk.*
v. rufescens *Moq.*
v. maculata *Kal.*

Limax marginatus (*Müll.*).(= *Limax arborum* *B.-Ch.*).

- v. nemorosa* *Baud.*
v. bettonii *Sordiella.*
v. maculata *Rbk.*
v. rupicola *L. & P.*
v. pallens *L. & P.*
v. alpestris *L. & P.*
v. fulva *Norm.*

GENUS AGRIOLIMAX *Malm.**Agriolimax agrestis* *L.*

- v. sylvatica* *Moq.*
v. punctata *Pic.*
v. nigra *Morelet.*
v. lilacina *Moq.*
v. albida *Pic.*
v. reticulata *Moq.*
v. tristis *Moq.*
v. obscura *Moq.*
v. rufescens *L. & P.*

Agriolimax lævis *Müll.*

FAMILY TESTACELLIDÆ.

GENUS TESTACELLA *Cuvier.**Testacella haliotideia* *Drap.**Testacella scutulum* *Sby.**Testacella maugei* *Fér.*

- v. viridans* *Morelet.*

FAMILY VITRINIDÆ.

GENUS VITRINA *Drap.*

- Vitrina pellucida* (*Mull.*).
 v. *depressiuscula* *Jeff.*
 v. *dillwynii* *Jeff.*

FAMILY ZONITIDÆ.

GENUS HYALINIA *Agassiz.**Polita* Held.

- Hyalinia draparnaldi* (*Beck*).
 v. *albina* (*Mog.*).
Hyalinia cellaria (*Mull.*).
 v. *complanata* (*Jeff.*).
 v. *albina* (*Mog.*).
Hyalinia glabra (*Studer*).
 v. *viridans* (*Ckl.*).
Hyalinia alliaria (*Miller*).
 v. *viridula* (*Jeff.*).
Hyalinia nitidula (*Drap.*).
 v. *nitens* (*Mich.*).
 v. *helmii* (*Alder*).
Hyalinia radiatula (*Alder*).
 v. *viridescens-alba* (*Jeff.*).
 [*Hyalinia petronella* (*Charp.*)].
Hyalinia pura (*Alder*).
 v. *margaritacea* (*Jeff.*).
Vitre Fitzinger.
Hyalinia crystallina (*Mull.*).
 v. *complanata* (*Jeff.*).
 v. *contracta* (*Westl.*).
Conulus Fitzinger.
Hyalinia fulva (*Mull.*).
 v. *mortoni* (*Jeff.*).
 v. *alderi* (*Gray*).
 v. *viridula* (*Taylor*).

Zonitoides Lehmann.

- Hyalinia nitida* (*Mull.*).
 v. *albina* (*Mog.*).
Hyalinia excavata (*Bean*).
 v. *vitrina* (*Fer.*).

FAMILY HELICIDÆ.

GENUS HELIX *L.**Patula* Held.

- Helix rotundata* *Mull.*
 v. *turtoni* *Flem.*
 v. *pyramidalis* *Jeff.*
 v. *minor* *Jeff.*
 v. *rufula* *Mog.*
 v. *alba* *Mog.*
 m. *sinistrorsum* *Taylor*.
Helix rupestris *Drap.*
 v. *trochoides* *Kregl.*
 v. *viridescens-alba* *Jeff.*

Punctum Morse.

- Helix pygmæa* *Drap.*
Acanthinula Beck.
Helix lamellata *Jeff.*
Helix aculeata *Mull.*
 v. *albida* *Jeff.*
Vallonia Risso.
Helix pulchella *Mull.*
 v. *costata* *Mull.*
Chilotrema Leach.
Helix lapicida *L.*
 v. *subangulata* *Pascal*
 v. *minor* *Mog.*
 v. *nigrescens* *Taylor*.
 v. *albina* *Menke*.

Gonostoma Held.

- Helix obvoluta* *Mull.*
Pomatia Leach.
Helix pomatia *L.*
 v. *albida* *Mog.*

- Helix aspersa* *Mull.*
 v. *conoidea* *Picard*.
 v. *globosa* *Mog.*
 v. *minor* *Mog.*
 v. *tenuior* *Shuttl.*
 v. *nigrescens* *Mog.*
 v. *undulata* *Mog.*
 v. *flammea* *Picard*.
 v. *albo-fasciata* *Jeff.*
 v. *zonata* *Mog.*
 v. *unicolor* *Mog.*
 v. *exalbida* *Menke*.
 m. *sinistrorsum* *Taylor*.
 m. *scalariforme* *Taylor*.

Tachea Leach.

- Helix nemoralis* *L.*
 v. *conica* *Pascal*.
 v. *compressa* *Terver*.
 v. *ponderosa* *Malm*.
 v. *major* *Fer.*
 v. *minor* *Mog.*
 v. *roseolabiata* *Taylor*.
 v. *albolabiata* *Von Mart.*
 v. *bimarginata* *Mog.*
 v. *rubella* *Mog.*
 v. *libellula* (*Risso*).
 v. *albina* *Mog.*
 v. *castanea* *Mog.*
 v. *olivacea* (*Risso*).
 v. *roseozonata* *Ckl.*
 v. *hyalozonata* *Taylor*.
 v. *undulata* *Gentiluomo*.
 m. *sinistrorsum* *Taylor*.
 m. *scalariforme* *Taylor*.

Helix hortensis Mull.

- v. minor *Moq.*
- v. roseolabiata *Taylor.*
- v. fuscolabiata *Von Mart.*
- v. tenuis *Baudon.*
- v. albina *Moq.*
- v. lutea *Moq.*
- v. incarnata *Moq.*
- v. olivacea *Taylor.*
- v. lilacina *Taylor.*
- v. roseozonata *Ckl.*
- v. arenicola *Macgill.*
- m. sinistrorsum *Taylor.*

Arianta Leach.*Helix arbustorum L.*

- v. alpestris *Ziegl.*
- v. conoidea *Westerl.*
- v. fusca *Fer.*
- v. canigonensis *Boubée.*
(= *repellini Taylor.*)
- v. fuscescens *D. & M.*
(= v. *marmorata Taylor.*)
- v. cincta *Taylor.*
(= *pallida Taylor.*)
- v. luteofasciata *D. & M.*
- v. flavescens *Moq.*
- v. albina *Moq.*
- v. major *Pfr.*
- v. minima *Pfr.*
- m. sinistrorsum *Taylor.*

Fruticicola Held.*Helix cantiana Mont.*

- v. pyramidata *Colb.*
- v. rubescens *Moq.*
- v. galloprovincialis *Dup.*
- v. albocincta *Ckl.*
- v. albida *Taylor.*
- m. sinistrorsum *Taylor.*

Helix cartusiana Mull.

- v. minor *Moq.*
- v. lactescens *Picard.*
(= v. *albida Jenner.*)
- v. leucoloma *Stabile.*
- v. rufilabris *Jeff.*

Helix rufescens Penn.

- v. depressa *Taylor.*
- v. minor *Jeff.*
- v. rubens *Moq.*
- v. albocincta *Ckl.*
- v. alba *Moq.*

Helix hispida L.(= *H. concinna Jeffreys.*)

- v. subglobosa *Jeff.*
- v. conica *Jeff.*
- v. hispida *Mousson.*
(= *H. hispida Jeffreys.*)
- v. depilata *Alder.*

v. nana *Jeff.*v. subrufa *Moq.*v. albocincta *Taylor*v. albida *Jeff.**Helix granulata Alder.*(= *H. sericea Jeffreys.*)v. carinata *Taylor.*v. cornea *Jeff.*v. albida *Tye.**Helix revelata Mich.**Helix fusca Mont.**Xerophila* Held.*Helix pisana Mull.*

- v. tenuis *Taylor.*
- v. minor *Bourg.*
- v. lineolata *Moq.*
- v. albida *Moq.*
- v. alba *Shuttl.*

Helix itala L.(= *H. ericetorum Mull.*)

- v. instabilis *Ziegl.*
- v. minor *Moq.*
- v. leucozona *Moq.*
- v. hyalozonata *Ckl.*
- v. alba *Charp.*
- m. sinistrorsum *Jeff.*

Helix caperata Mont.

- v. gigaxii *Charp.*
- v. subscalaris *Jeff.*
- v. major *Jeff.*
- v. bizonalis *Moq.*
- v. ornata *Picard.*
- v. fulva *Moq.*
- v. oblitterata *Picard.*
- v. alba *Picard.*

Helix virgata Da Costa.

- v. depressa *Reg.*
- v. subaperta *Jeff.*
- v. subglobosa *Jeff.*
- v. carinata *Jeff.*
- v. lineata *Olivi.*
(= v. *submaritima Jeffreys.*)
- v. major *Taylor.*
- v. minor *Taylor.*
- v. leucozona *Taylor.*
- v. maculata *Moq.*
- v. radiata *Hidalgo.*
- v. nigrescens *Grat.*
- v. hypozona *Moq.*
- v. subalbida *Poirét.*
- v. albicans *Grat.*
- v. hyalozona *Taylor.*
- v. alba *Taylor.*
- m. sinistrorsum *Taylor.*

Turricula Beck.
[*Helix terrestris Penn.*].
[v. *grisea Moq.*].

Cochlicella Risso.
Helix acuta Mull.
v. *inflata Moq.*
v. *elongata (Cr. & Jan.)*.
v. *bizona Moq.*
v. *flammulata Bourg.*
v. *strigata (Menke)*.
v. *articulata (Lam.)*.
v. *nigrescens (Taylor)*.
v. *alba (Requien)*.

FAMILY PUPIDÆ.

GENUS BULIMINUS Ehrenberg.

Buliminus montanus (Drap.).
v. *albina (Moq.)*.

Buliminus obscurus (Mull.).
v. *albina (Moq.)*.

GENUS PUPA Draparnaud.

Torquilla Studer.
Pupa secale Drap.
v. *edentula Taylor*.
v. *boileausiana Charp.*
v. *minor Moq.*
v. *alba Jeff.*

[*Pupa cinerea Drap.*].

Lauria Gray.
Pupa anglica (Fér.).
(= *P. ringens Jeffreys*).
v. *pallida Jeff.*

Pupa cylindracea (Da Costa).
(= *P. umbilicata Drap.*).
v. *edentula Moq.*
v. *gracilis Issel.*
v. *curta Westl.*
v. *semproni Charp.*
v. *albina Moq.*

Pupilla Gray.
Pupa muscorum (L.).
(= *Pupa marginata Drap.*).
v. *bigranata Rossm.*
v. *unidentata C. Pfr.*
v. *elongata Clessin.*
v. *brevis Baudon.*
v. *albina Menke.*

GENUS VERTIGO Mull.

Alwa Jeffreys.
Vertigo antivertigo (Drap.).
v. *octodentata (Hartm.)*.
v. *sexdentata (Mont.)*.
Vertigo moulinsiana (Dup.).
v. *lilljeborgi Westl.*
v. *bidentata Jeff.*

Vertigo pygmæa (Drap.).
v. *quadridentata Stud.*
v. *pallida Jeff.*

*Vertigo alpestris Alder.**Vertigo substriata (Jeff.)*.

Vertilla Moquin-Tandon.
Vertigo pusilla Mull.
v. *tumida Westl.*

Vertigo angustior Jeff.

Sphæradium Agassiz.
Vertigo edentula (Drap.).
v. *columella (Von Mart.)*.

Isthmia Gray.
Vertigo minutissima (Hartm.).

GENUS BALEA Prideaux.

Balea perversa (L.).
v. *viridula Jeff.*
v. *simplex Moq.*

GENUS CLAUSILIA Drap.

Pirotoma Vest.
Clausilia perversa (Pult.).
(= *C. rugosa Drap.*).

v. *dubia Drap.*
v. *suttoni Westl.*
(= v. *schlechtii Jeffreys*).
v. *gracilior Jeff.*
v. *tumidula Jeff.*
v. *parvula Turt.*
v. *everetti (Miller)*.
v. *albina Moq.*
m. *dextrorsum Jeff.*

Clausilia rolpheii Gray.
v. *pellucida Taylor.*

Alinda H. & A. Adams.
Clausilia biplicata (Mont.).
v. *nelsoni Jeff.*

Marpessa Gray.
Clausilia laminata (Mont.).
v. *pellucida Jeff.*
v. *albina Moq.*

FAMILY STENOGYRIDÆ.

GENUS AZECA Leach.

Azeca tridens (Pult.).
v. *nouletiana Dup.*
v. *alzenensis St. Simon.*
v. *crystallina (Dup.)*.
m. *sinistrorsum (Taylor)*.

GENUS COCHLICOPA Fer.

Cochlicopa lubrica (Mull.).
v. *lubricoides Fer.*
v. *ovata Jeff.*
v. *morseana (Doherty)*.
v. *exigua (Menke)*.
v. *fusca Moq.*
v. *hyalina Jeff.*

GENUS CÆCILIOIDES *Blainville*.
Cæcilioides acicula (*Mull.*).

GENUS STENOGYRA *Shuttl.*
[*Stenogyra goodalli* (*Mull.*).].

FAMILY SUCCINEIDÆ.

GENUS SUCCINEA *Drap.*

Succinea putris (*L.*).
v. subglobosa *Jeff.*
v. stagnalis *Gassies.*
v. solidula *Jeff.*
v. vitrea *Moq.*
v. albida *Mörch.*

Succinea elegans *Risso.*
v. longiscata *Morel.*
v. pfeifferi *Rossm.*
v. minor *Jeff.*
v. virescens *Morel.*
v. ochracea *Betta.*
v. albida *Taylor.*
m. sinistrorsum *Baud.*
Succinea oblonga *Drap.*

SUB-OR. PULMONOBRANCHIATA.

FAMILY AURICULIDÆ.

GENUS CARYCHIUM *Mull.*

Carychium minimum *Mull.*
v. tridentata (*Risso*).

FAMILY LIMNÆIDÆ.

SUB-FAMILY PLANORBINÆ.

GENUS SEGMENTINA *Fleming.*
Segmentina nitida (*Mull.*).
(= *Planorbis lineatus* *Walker*).
v. albina (*Taylor*).

GENUS PLANORBIS *Guetard.*

Hippeutis *Hartmann.*

Planorbis fontanus (*Lightfoot*).
(= *Planorbis nitidus* *Jeffreys*).
v. albida *Nelson.*

Gyraulus *Agassiz.*

Planorbis nautilus (*L.*).
v. crista (*L.*).
v. lævigata *Adami.*

Planorbis dilatatus *Gould.*

Planorbis albus (*L.*).
v. draparnaldi (*Shepp.*).

Planorbis parvus *Say*
(= *P. glaber* *Jeff.*).
v. compressa *Lloyd.*

Gyrorbis *Agassiz.*

Planorbis spirorbis *Mull.*
v. ecarinata *Jeff.*
v. albida *Nelson.*
m. scalariforme *N. & T.*

Planorbis vortex (*L.*).
v. compressa *Mich.*

Planorbis carinatus *Mull.*
v. disciformis *Jeff.*
v. albida *Hudson.*

Planorbis umbilicatus *Mull.*
(= *P. complanatus* *Jeffreys*).
v. rhombea (*Turt.*).
v. albina *Jeff.*
m. sinistrorsum *Taylor.*

Coretus *Adanson.*

Planorbis corneus (*L.*).
v. albina *Moq.*

Bathyomphalus *Agassiz.*

Planorbis contortus (*L.*).
v. minor *Taylor.*
v. albida *Jeff.*

SUB-FAMILY PHYSINÆ.

GENUS BULLINUS *Adanson.*

Bullinus hypnorum (*L.*).
v. major (*Moq.*).
v. rubra *Tryon.*
m. decollatum (*Nelson*).

GENUS PHYSA *Drap.*

Physa fontinalis (*L.*).
v. inflata *Moq.*
v. curta *Jeff.*
v. oblonga *Jeff.*
v. albina *Jeff.*

SUB-FAMILY LIMNÆINÆ.

GENUS AMPHIPEPLEA *Nilsson.*

Amphipeplea glutinosa (*Mull.*).
v. mucronata (*Jeff.*).

GENUS LIMNÆA *Bruguiere.*

Radix *Montfort.*

Limnæa involuta *Harvey.*

Limnæa peregra (*Mull.*).
v. burnetti *Alder.*
v. obtusa *Kob.*
v. lacustris (*Leach*).
v. inflata *Kob.*
v. patula (*Da Costa*).
v. ovata *Drap.*
v. stagnalisformis *Taylor.*
v. acuminata *Jeff.*
v. intermedia *Fer.*
v. oblonga *Jeff.*
v. boissyi *Dupuy.*
v. vulgaris *C. Pfr.*
v. pulchella *Roff.*
v. succineiformis *Jeff.*
v. maritima *Jeff.*
v. microstoma *Kob.*
v. lutea (*Mont.*).

- v. diaphana *Parr.*
- v. picta *Jeff.*
- v. candida *Porro.*
- v. lineata *Bean.*
- v. labiosa *Jeff.*
- m. sinistrorsum *Jeff.*
- m. scalariforme *Jeff.*
- m. decollatum *Jeff.*

Limnæa auricularia (L.).

- v. acuta *Jeff.*
- v. ampla (*Hartm.*).
- v. reflexa *Nelson.*
- v. magna *Colb.*
- v. minor *Mog.*
- v. albida *Jeff.*

Limnophysa Fitzinger.

Limnæa stagnalis (L.).

- v. fragilis (L.).
- v. bottnica *Clessin.*
- v. lacustris *Studer.*
- v. labiata *Jeff.*
- v. variegata *Hazay.*
- v. albida *Jeff.*
- m. sinistrorsum *Jeff.*

Limnæa palustris (Mull.).

- v. corva (*Gmel.*).
- v. obesa *Taylor.*
- v. elongata *Mog.*
- v. conica *Jeff.*
- v. minor *Taylor.*
- v. tincta *Jeff.*
- v. lacunosa *Zgl.*
- v. fasciata *Nelson.*
- v. roseolabiata *Jeff.*
- v. albida *Nelson.*
- m. decollatum *Jeff.*

Limnæa truncatula (Mull.).

- v. ventricosa *Mog.*
- v. elegans *Jeff.*
- v. microstoma *Drouet.*
- v. major *Mog.*
- v. minor *Mog.*
- v. albida *Jeff.*
- m. scalariforme *Jeff.*

Omphiscola Beck.

Limnæa glabra (Mull.).

- v. elongata *Jeff.*
- v. major *Gassies.*
- m. decollatum *Nelson.*

SUB-FAMILY *ANCYLINÆ*.

GENUS *ANCYLUS* *Geoffroy.*

Ancylus fluviatilis Mull.

- v. capuloides *Jan.*

- v. gibbosa *Bourg.*

- v. stricta *Morel.*

- v. albida *Jeff.*

GENUS *VELLETIA* *Gray.*

Velletia lacustris (L.).

- v. compressa (*Jeff.*).
- v. moquiniana (*Bourg.*).
- v. albida (*Jeff.*).

ORDER OPERCULATA.

SUB-ORDER PULMONATA.

FAMILY CYCLOSTOMIDÆ.

GENUS *CYCLOSTOMA* *Montf.*

Cyclostoma elegans (Mull.).

- v. marmorea *Brown.*
- v. albescens *Des Moulins.*
- v. ochroleuca *Mog.*
- v. fasciata *Picard.*

FAMILY ACICULIDÆ.

GENUS *ACICULA* *Hartmann.*

Acicula lineata (Drap.).

- v. alba (*Jeff.*).
- m. sinistrorsum (*Jeff.*).

SUB-OR. PECTINIBRANCHIATA.

FAMILY NERITIDÆ.

GENUS *NERITINA* *Lam.*

Neritina fluviatilis (L.).

- v. cerina *Colb.*
- v. trifasciata *Colb.*
- v. undulata *Colb.*
- v. nigrescens *Colb.*

FAMILY PALUDINIDÆ.

GENUS *VIVIPARUS* *Montf.*

Viviparus contectus (Millet).

- v. virescens (*Jeff.*).

Viviparus viviparus (L.).

- v. albida (*N. & T.*).
- v. efasciata (*Pickering*).
- (= v. unicolor *Jeffr.*).
- v. atro-purpurea (*Lloyd*).

GENUS *BYTHINIA* *Gray.*

Bythinia tentaculata (L.).

- v. producta *Menke.*
- v. ventricosa *Menke.*
- v. excavata *Jeff.*
- v. albida *Rimmer.*
- m. decollatum *Jeff.*

Bythinia leachii (Shepp.).

- v. elongata *Jeff.*
- v. albida *Rimmer.*

FAMILY VALVATIDÆ.

GENUS VALVATA *Mull.*

- Valvata piscinalis* (*Mull.*).
 v. *depressa* *C. Pfr.*
 v. *antiqua* *Sow.*
 (= v. *subcylindrica* *Jeff.*).
 v. *acuminata* *Jeff.*
 m. *sinistrorsum* *Jeff.*
- Valvata cristata* *Mull.*
 v. *alba* *Rowe.*

CLASS ACEPHALA.

SUB-CLASS PELECYPODA.

ORDER LAMELLIBRANCHIATA.

SUB-ORDER ISOMYA.

FAMILY UNIONIDÆ.

GENUS UNIO *Philippsson.*

- Unio tumidus* *Phil.*
 v. *mulleri* *Rossm.*
 v. *ovalis* (*Mont.*).
 v. *ponderosa* *Pascal.*
 v. *radiata* *Colb.*
- Unio pictorum* (*L.*).
 v. *curvirostris* *Norm.*
 v. *latior* *Jeff.*
 v. *compressa* *Jeff.*
 v. *radiata* *Moq.*
 Margaritana *Schum.*
- Unio margaritifera* (*L.*).
 v. *sinuata* *Lam.*
 v. *roissyi* *Mich.*

GENUS ANODONTA *Lam.*

- Anodonta cygnea* (*L.*).
 v. *arenaria* (*Schröter*).
 v. *rostrata* *Rossm.*
 v. *stagnalis* (*Sow.*).
 v. *incrassata* (*Shepp.*).
 v. *radiata* (*Mull.*).
 v. *pallida* *Jeff.*
- Anodonta anatina* (*L.*).
 v. *ventricosa* *C. Pfr.*
 v. *complanata* *Rossm.*
 v. *radiata* *Jeff.*

FAMILY SPHÆRIIDÆ.

GENUS SPHÆRIUM *Scop.*

- Sphærium corneum* (*L.*).
 v. *pisidioides* *Gray.*
 v. *scaldiana* (*Norm.*).
 v. *nucleus* (*Stud.*).
 v. *flavescens* (*Macgill.*).
Sphærium rivicola (*Leach*).
 v. *flavescens* *Moq.*
Sphærium pallidum *Gray.*
 (= *S. ovale* *Jeff.*).
Sphærium lacustre (*Mull.*).
 v. *ryckholtii* (*Norm.*).
 v. *rotunda* *Jeff.*
 v. *brochoniana* *Bourg.*
 v. *ovalis* (*Fer.*).

GENUS PISIDIUM *C. Pfeiffer.*

- Pisidium amnicum* (*Mull.*).
 v. *flavescens* *Moq.*
 v. *leviuscula* *Moq.*
Pisidium fontinale (*Drap.*).
 v. *henslowana* (*Shepp.*).
 v. *pulchella* *Jenyns.*
 v. *cinerea* *Alder.*
 v. *pallida* *Gassies.*
Pisidium pusillum (*Gmelin*).
 v. *obtusalis* (*Lam.*).
 v. *grandis* *Adams.*
Pisidium nitidum *Jen.*
 v. *globosa* *Adams.*
 v. *splendens* *Moq.*
Pisidium milium *Held.*
 (= *P. roseum* *Jeff.*).
 v. *alpestris* *Clessin.*

SUB-ORDER HETEROMYA.

FAMILY MYTILIDÆ.

GENUS DREISSENSIA *Van Ben.*

- Dreissensia polymorpha* (*Pall.*).
 v. *angusta* *Colb.*
 v. *dilatata* *Colb.*

The Committee have been anxious to keep the varietal nomenclature within reasonable bounds, believing that the best interests of the study will be served by prudence and moderation in this particular.

A host of varieties of British species have been named by Conchologists in England and elsewhere since the publication of the Society's list in 1883, but while we are convinced that the more distinct and striking forms of every species should be definitely distinguished, we cannot assent to the publication of distinct names for the slighter modifications which connect together the specimens showing the strongly marked peculiarities which alone should be accepted in the general nomenclature.

Holding the opinion that varietal names should chiefly be used to distinguish modifications which may be considered to have a racial character, and are congenital and transmissible in a greater or lesser degree to their offspring, we earnestly deprecate the lavish institution of definite names to specimens that are manifestly deformed, injured, or irregularly grown. These abnormal shells may really be considered as mutilated shells that have repaired the injuries sustained from adverse surroundings.

We cannot look for much difference in the organization of the animal in varieties, but this point is often a crucial and invaluable test of specific difference.

One of the objects of discriminating varieties is to elicit the laws or forces which tend to produce them, and this will be all the sooner achieved if we bring prominently forward only the more striking modifications to which each species is subject.

The **Slugs** have during the past decade been very closely and attentively studied ; the result being that no less than three valid species of *Arion* have been added to the British list ; that the specific distinctness of *Testacella scutulum* has been conclusively proved, and that the specific nomenclature of *Amalia marginata* and *Limax arborum* has been corrected. Details of all these changes have been published in the 'Journal of Conchology' and elsewhere.

The name **Hyalinia** has been adopted as the most suitable name for the genus hitherto known as *Zonites*. It has been suggested that this name has too great a similarity to that of *Hyalina* and *Hyalinus* which are used for other genera or in other departments of zoology, but we are of opinion that the names are sufficiently distinct to avoid any confusion.

H. draparnaldi is introduced amongst the British *Hyaliniæ*; it is closely allied to and has been confounded with *H. cellaria*, of which species Jeffreys would seem at one time to have regarded it as his var. *compacta*.

H. glabra.—The real identity of the shell known under this name in England is not yet established beyond doubt, the leading continental conchologists, whom we have consulted on the question, differing very widely in their views, and we have not yet been able to obtain living continental specimens for comparison.

Hyalinia petronella is tentatively included in the list on the strength of a specimen or specimens found by Mr. Rogers in Cheshire, and which are now in the collection of Mr. Ponsonby, and in the hope that the publication of this discovery may lead to further investigation.

Fitzinger's name **Vitrea** is accepted to indicate subgenerically *H. crystallina* in the same sense in which it appears to have been used by its author.

The term **Conulus** proposed at the same time for *H. fulva* is also used here in a similar way.

H. nitida and **excavata** form the group *Zonitoides*, interesting as being the only British *Hyalinia* possessing love-darts.

The s.g. **Punctum** has been adopted for *Helix pygmæa*, with the object of emphasizing the peculiarity in the jaw, which instead of being formed of a single piece as in the majority of the *Helicidæ*, is composed of a number of separate plates—as in the *Orthalicidæ*, with which group Morse and Binney united *Punctum* for this reason.

Helix cantiana var. **albocincta**.—This interesting variation, which is characterised by a pale peripheral zone, or band, usually most strongly marked near the aperture, owing to the increasing intensity and darker colour of the presumed confluent banding, occurs in several species and is brought prominently forward so as to elicit, if possible, further information upon those manifest traces of spiral banding (occasionally occurring in shells usually unicolourous) which may be, as some assert, nascent, but are more probably the rudimentary expression of bands formerly existent. Latterly there has been considerable discussion in 'Science Gossip' and elsewhere upon this subject, originated by a statement made in a valedictory address to this Society in 1887, but these discussions achieved no useful end, as the point of dispute became quite removed from the original statement, and a lengthy controversy arose upon a subject about which—except perhaps for argumentative reasons—there has been, we should imagine, no serious dispute, viz.: the original colour of the nascent molluscan shell in the distant ages when the developing characters of the mollusca were separating them from the allied groups, a point not at all pertinent to the original statement which initiated the discussion.

In our opinion it is very probable that these traces of banding are not the early stages of banding in process of development, but the vestiges of bands formerly existent and derived from banded ancestors. This statement does not affect in the slightest the question of the original colour of the primitive molluscan shell, but is intended to apply only to the ancestral *Helix* or *Helices* from which we now assume our obsoletely, as well as distinctly, banded *Helices* to have descended.

It is, we think, somewhat improbable that a number of species of different habits and habitats should all simultaneously evolve nascent bands of such an exactly uniform character and arrangement. Should we not rather assign this remarkable uniformity of character and disposition of banded markings to

community of origin, and reasonably look for and expect some diversity in aspect and plan if peculiarities such as these were originating independently in a number of totally distinct species. On this ground we are disposed to think that species like *cantiana*, *cartusiana*, etc., have descended from banded forms and still retain characters in common which point to their probably identical origin.

As has been frequently shown, the nature of the habitat materially influences shell-markings. *H. virgata* may be instanced as a striking example, and it is quite conceivable that owing to changes of habit or habitat some amount of, what we may designate for want of a better term, oscillation may have taken place in the intensity or obliteration of band-markings.

H. cartusiana var. **lactescens** Picard.—Mr. Hillman has recently discovered, in England, an albine form of this shell, which Mr. Jenner has named var. *albida*, but, as Picard had previously distinguished this by the name of *lactescens*, his name takes precedence.

H. hispida L. The type specimen of this species in the Linnean collection is the form named by Jeffreys *H. concinna*. It has already been pointed out that no difference in the organization has as yet been detected between what have usually been termed *H. hispida* and *H. concinna*, and that they should probably be united together as a single species. It will be recollected that Dr. Jeffreys eventually considered that the two forms should not be separated, but as *H. concinna* had been accepted by others as a valid species, he restored it to specific rank, and it would almost appear against his own convictions of its specific value. If *H. concinna* be thus accepted as the type form of *H. hispida* we must distinguish the ordinary very hispid form, and perhaps we cannot do better than adopt Mousson's name, *hispidosa*.

H. granulata Alder is substituted for the name *H. sericea* Muller, as it seems now to be almost universally considered that Muller's species is not identical with Alder's, whose name is now restored to the British form.

The *H. itala* of Linné would appear without doubt to be the *H. ericetorum* of authors. Linné's own handwriting upon the specimen in the Linnean collection leaving no doubt upon the point, so that there would seem to be no alternative but to adopt Linné's name if the recommendations of the British Association be followed.

Helix virgata var. *lineata* Olivi. — This is the shell referred by Dr. Jeffreys to var. *submaritima* Desm., but we are fortified in the opinion that it is really the *H. maritima* of Drap. = *H. lineata* Olivi by the opinion of some of the leading European Conchologists, whom we have consulted upon this question. Dr. Jeffreys himself remarked upon the great similarity existing between his var. *submaritima*, and the *H. maritima* of Drap., but did not actually combine them. It has, in France, been considered as distinct from *H. virgata*, and a great number of varieties of it have been distinguished by various authors.

Helix terrestris Pennant (= *H. elegans* Gmelin) is included solely on the ground of its discovery near Dover by Mrs McDakin. It is hoped that the species will become firmly established in this country and form a permanent addition to our list.

The proper position of *Helix acuta* is a somewhat doubtful question, and in placing it in its present position we have followed the lead of distinguished continental naturalists.

The term *Buliminus* is now used for *montanus* and *obscurus*, the old generic name of *Bulimus* is now used in a more restricted sense for the large tropical forms.

Pupa cinerea Drap. is introduced provisionally in the faint hope that its claim to inclusion in the British list may be strengthened by further observation.

Pupa anglica Fér. is restored for *P. ringens* Jeffreys, as it appears to have been sufficiently brought forward under this name prior to Jeffreys' description.

It is universally allowed that the *Pupa cylindracea* of Da Costa is the *Pupa umbilicata* of Drap. ; this name, therefore, takes precedence of Draparnaud's to which we have become so well accustomed.

Pupa muscorum L.—The type specimen of this shell still exists in the Linnean Cabinet, and is the edentate form, which thus becomes the type. The var. *unidentata* of C. Pfr. will now indicate the specimens with the single denticle on the body whorl, previously considered to be the typical form.

In the genus **Vertigo** we have reduced the *V. lilljeborgi* to a variety only of *moulinsiana* and have also placed *V. tumida* as a var. of *V. pusilla*, in which course we have the support of the author, Dr. Westerlund.

C. rugosa v. schlechtii Zelebor.—Dr. Jeffreys referred some peculiar shells of the var. *dubia*, found by Mr. W. D. Sutton in Northumberland and Durham, to the above variety. Dr. Westerlund denies that they represent the form named thus by Zelebor, and has therefore re-named the form *suttoni*, a course in which Dr. Böttger and others concur. They, however, include in the var. *suttoni* the large coarsely striated form of var. *dubia*, especially characteristic of the North of England, but we are unable to fall in with this view, and for the present retain this form under its old name of *dubia*.

Cochlicopa lubrica v. morseana Doherty is a very large and long form of the species described by Doherty from American specimens some years ago. Its claim to British rank rests upon its discovery in Hampshire by the Rev. W. W. Eyre, of Swarraton, near Alresford.

The **Succineæ** have at all times been a fertile source of perplexity, and to avoid further confusion we retain the three well-known species only—*putris*, *elegans*, and *oblonga*—which we consider to be the only British species entitled to specific rank. *S. stagnalis* and *S. vitrea* we regard as forms of *putris*,

and *pfeifferi* and *virescens* as varieties of *elegans*. The claims of some other species or varieties that have been brought forward can scarcely be considered as well established.

Planorbis fontanus.—To avoid confusion we think it better in this case not to follow strict priority.

Valvata piscinalis v. antiqua Sow. is now considered to be practically the form named by Dr. Jeffreys v. *subcylindrica*, and as Sowerby's name has priority it has been adopted in the list.

Under **Anodonta cygnea** we have introduced as a form worthy of note the var. *stagnalis*, which is a form nearly approaching a circular outline; the var. *arenaria* represents the extreme form of *zellensis*; the var. *zellensis*, as ordinarily understood, is the true specific type of *A. cygnea*.

A. anatina we also still retain as distinct from *A. cygnea*, there being some reasons for maintaining it as a separate species.

Unio tumidus v. mulleri Rossm.—This variety, which is characterised by its very ovoid outline, is added to our list. It was found by Mr. H. E. Quilter in Groby Pool, Leicestershire, during 1885.

Sphærium ovale Fér. has disappeared from the list as a species, Gray's name of *pallidum* superseding it, as we are inclined to believe that an uncapped or indistinctly capped form of *S. lacustre* is the true *S. ovale* of Férussac, and we have therefore placed it as a variety under that species.

The **P. roseum** of Scholtz is not considered to be the same as Jeffreys' species by those who have made a special study of the group, and Held's name of *milium* is therefore substituted as our species is considered to be referable to that form. A variety **alpestris** is also included, as specimens found by Mr. E. Pickard, of Mansfield, have been considered by Clessin to represent his variety.

Other minor modifications hardly call for special remark, but in all changes we have been solely guided by the desire to render the list more useful in showing the affinities of the various species and groups.

A few varieties included in the foregoing list not having been as yet formally described, although the names have been frequently made use of both in print and in ms., it will be conducive to convenience to give descriptions.

Arion ater var. **brunnea** Rbk.

Animal uniform deep brown.

This form is very distinct indeed from var. *rufa*, to which some writers have assigned it.—W.D.R.

Arion ater var. **bicolor** Rbk.

Animal bright chocolate-brown on the back, brilliant primrose-yellow on the sides, the line of demarcation between the two colours being sharp and decided.

This is the variety which I have always spoken of as the var. *bicolor* Moq. ; and it agrees with his description. But Moquin-Tandon refers to a figure of Férussac's as the basis of his description, and Férussac's figure is not *Arion ater* at all, but *A. subfuscus* of typical colour. This being the case, Mr. Cockerell and others have attached my name to the var. *bicolor* as British, although I have never formally described it. I have no objection to accepting the responsibility, inasmuch as I was the first to record it as British, which I did some years ago in 'Science Gossip.' My own opinion, however, inclines to attributing the variety to Moquin-Tandon, expressly excluding his reference to Férussac's figure ; but as the question is one on which great divergence of opinion is possible, it will be well for the present to leave it open.—W.D.R.

Arion circumscriptus var. **subfusca** Rbk.

Animal brownish with dark bands.

This is simply the brownish form which corresponds to the var. *subfusca* of *A. hortensis*, on which account I have used the same varietal name.

Limax cinereo-niger Wolf.

Some authors consider this to be merely a variety of *L. maximus*, on the ground that in the anatomy of the

genital organs, which is so useful a guide to the specific distinction of slugs, it does not materially differ from that form. Its external characters are, however, so distinct and unmistakable that it is at least entitled to subspecific rank. It is, therefore, included in this list as distinct from its very close ally. I may mention here that nearly all the British examples on record have passed through my hands, so that I have had ample grounds upon which to base an opinion.—W.D.R.



A REVISED LIST OF THE SPECIES OF BRITISH SLUGS.

By T. D. A. COCKERELL.

My recent researches among the slugs have led me to some opinions about the British species, different from those usually held in this country, and which, if correct, will necessitate a considerable revision of the nomenclature hitherto in use.

I hope in due course to set forth all these points in full, but I have thought it might be of interest to the members of the Conchological Society to have a list of the British slugs, as proposed to be revised.

TESTACELLIDÆ.

Testacella Cuv. 1800.

*T. haliotide*a Drap. 1801

T. scutulum Sby. 1823.

T. maugei (Fér.) Desh. 1830.

LIMACIDÆ.

Limax Linn., 1758.

NOTE.—The Linnean genus *Limax* included *Arion*, and the first two species mentioned belong to the latter genus. It is certain, however, that the first mentioned species of the Linnean genera were not specially intended

as the types, the arrangement being rather one of diverging forms round a type placed in the middle of the genus. Linnean genera were not represented by a *type species*, like modern genera, and a selection of the first-named as the type would cause many unnecessary difficulties. Brard's *Limacella* (1815) consisted of the *shells* of slugs, and does not merit recognition. Turton in 1831 called it *Limacellus*, but no author since that date has attempted to make one genus out of a slug and another out of its shell! Jousseaume (1876) made Brard's *Limacella* to include the *Limax* of modern authors, and used *Limax* for *Arion*, but nobody has followed this arrangement.

L. maximus L., 1758.

NOTE.—‘*L. cinereus maculatus*’ of Linné must surely be this species, and not *cinereo-niger*, as some have thought. *L. cellarius* D’Arg. has priority (1757), but is pre-Linnean and therefore inadmissible.

L. cinereo-niger Wolf, 1805.

Subg. LEHMANNIA Heyn. 1863.

L. marginatus Müll., 1774.

NOTE.—Müller’s description evidently refers to what we call *arborum* B.-Ch. (1838). *L. sylvestris* Scopoli, 1772, is almost surely the same species, and it has priority. The description is so vague as to leave a doubt, however, so I do not here adopt Scopoli’s name.

L. flavus Linn., 1758.

NOTE.—There can be no doubt that *flavus* L. is what has been more generally called *variegatus* Drap. (1801).

Subg. MALACOLIMAX Malm, 1868.

L. tenellus Nilss., 1822.

NOTE.—I am not aware that any British specimen of *tenellus* has been found of late years, nor do I know where an example is preserved.

AGRIOLIMAX Mörch, 1868.

NOTE.—This genus is now very generally accepted as valid, and its characters have often been pointed out.

A. agrestis Linn., 1758.

NOTE.—*L. hyalinus* L., Ed. XII., 1767, is almost certainly the young of *agrestis*, and being mentioned first in the twelfth edition would have priority if that edition were taken as the earliest to be quoted for names. In the tenth edition, 1758, there is no *hyalinus* recorded, but *agrestis* is duly inserted, and so obtains priority.

AMALIA Moq., 1855.

A. gagates (Drap., 1801). Heyn., 1861.

Subsp. **A. plumbea** (Moq., 1855).

NOTE.—While recently revising the species allied to *gagates*, I came to the conclusion that in addition to the typical form, we must recognise a northern subspecies equivalent to the var. *plumbea* of Moquin-Tandon, and some allied forms; and a southern or Mediterranean subspecies including *bedriagæ* Less. & Poll., and a new form which I have called *mediterranea*. The typical *gagates* is rare in Britain.

A. sowerbyi (Fér., 1823). Heyn.

NOTE.—I had adopted the name *A. carinata* (Leach, 1820) for this species, but it is perhaps better to call it *sowerbyi*. Leach's work was certainly printed in part in 1820, and a bound copy in the British Museum has the description of *L. carinatus* on p. 73. It is also certain that a few unbound copies were distributed privately, and Turton and others considered it sufficiently published for quotation. (See, for instance, Turton's 'Manual,' 1831, p. 25.) But the work never appears to have been on sale until Gray reprinted it in 1852.

ARIONIDÆ.

Arion Fér., 1819.

A. (ater subsp.) empiricorum Fér., 1819.

NOTE.—Pollonera has shown that the true *ater* differs somewhat from *empiricorum* in its genitalia, amounting, I think, to a subspecific distinction. Our form, at least in the South of England, is certainly *empiricorum*. We get three main subspecific forms of *ater* in Europe, *ater* of the North, *empiricorum* of the central regions, and *sulcatus* with its allies in Portugal.

A. subfuscus (Drap., 1805), Mich., 1831.

A. intermedius Norm., 1852.

NOTE.—This is the species lately introduced as *A. minimus* Simroth, 1885.

A. hortensis Fér., 1819.

A. circumscriptus (Johnston, 1828), Fér.

NOTE.—This is certainly what we usually call *A. bourguignati* Mab., 1868. The British form of *bourguignati* agrees with *circumscriptus*, and is not keeled in the adult state. Mr. Pollonera, to whom I mentioned this reference, writes me that our species, lacking a keel in the adult state, can hardly be *bourguignati*, but may be his *A. ambiguus*. It does not, however, agree with his figures of *Arion ambiguus*, and specimens of *bourguignati* he kindly sent me from Ceresole Reale, Piedmont, appear to me to be quite identical with our species. It still remains doubtful, allowing that *bourguignati* = *circumscriptus*, whether the still earlier name, *A. fasciatus* (Nilsson, 1822), should not be preferred, for, as Mr. Pollonera writes me, although Nilsson confounded several species under *fasciatus*, his type was the true *bourguignati*.

GEOMALACUS Allm., 1842.

G. maculosus Allm., 1846.

NOTE.—Among the Irish examples of this species in

the British Museum, I found a var. nov. *fasciatus* with the ground-colour white or whitish, the mantle marbled with black or dark brown, and with dark lateral bands. The body is hardly marbled, pale, with four dark longitudinal bands, two subdorsal and two lateral. This banded variety is very interesting, as showing a tendency towards strongly quadrifasciate species, like *G. moreleti* (Hesse) from Tangier, which have hitherto seemed so very different.

DESCRIPTION OF A NEW SPECIES OF SPONDYLUS AND A NEW HELIX.

BY EDGAR A. SMITH, F.Z.S.

(Read before the Conchological Society, May 11, 1892).

IN the year 1889 Mr. Harcourt Powell presented to the British Museum a specimen of a *Spondylus* from Madeira, which on account of its being so overgrown with worm-tubes, corallines, nullipores, and other extraneous growths, I was unable to determine. We are now indebted to this gentlemen for two additional specimens of the same species, one of which is in such condition as to enable me to prepare the following description.

Spondylus powelli.

Testa magna, subglobosa, solidissima, rubro-purpurea; valvæ leviter obliquæ, postice productæ; sinistra costis circiter 11 subæquidistantibus, tenuibus, spinis brevibus armatis, et inter costas alis minus conspicuis iuncta, lineis radiantibus tenuissimis minute squamulatis incrementique lineis undulatis pulcherrime sculpta; valva dextra prope marginem costis numerosis subæqualibus instructa, intus sub cardine profunde excavata; pagina interna albida, viride vel livido plus minus tincta, ad marginem saturate roseo vel purpureo limbata, utrinque versus aurículas tenuiter denticulata vel crenulata, ad marginem ventralem dentibus fortioribus munita; area ligamenti triangularis valvæ dextræ magna, fere æquilateralis, ad apicem postice inclinata; dentes valvæ sinistræ fusco tincta, sinistræ fere albi.

Longit. circa 125 millim., alt. ab. apice valvæ dextræ ad marginem ventralem 150 mill., valvæ sinistræ 130; diam. 90 mill.

Hab. : Madeira, at a depth of four fathoms (Powell); Porto Grande, San Vincent, Cape Verde Islands, in Brit. Mus., collected by J. Macgillivray during the voyage of H.M.S. Herald.

This is a very solid ponderous species, remarkable for the brightly coloured border within the valves and the character of the sculpture. This consists in the left or upper valve of about eleven radiating sub-equidistant ribs, which bear numerous very short blunted spines. The spaces between these principal ribs are divided by very narrow radiating sulci into five or six less pronounced ribs, which, at their terminations, form notches at the margin. In addition to these ribs the entire surface, when not overgrown or abraded, exhibits a very minute sculpture consisting of extremely fine and minutely prickly or squamate radiating liræ, crossed by fine wavy lines of growth. The right or attached valve appears to be more equally and more strongly ribbed than the other. The ribs are finer at the sides towards the auricles, and rather stronger towards the posterior lower part than in front, the crenulation of the margin varying in coarseness accordingly. The ligamental area of the right valve is large, as usual in most species, curves slightly backwards, is nearly equilaterally triangular, the groove being only visible near the apex. The interior of the valves between the pallial line and the purple, coral-red, or deep rose border, is white, the rest of the surface enclosed by the pallial line is dirty whitish, and more or less stained with patches of a greenish or livid tint. The strong hinge-teeth in the left or upper valve are stained with brown, and also the dentiform projections on each side in the other valve. The two central teeth in this valve, between which the ligament rests, are generally white. The inner margin of the valves on each side at, and a little below, the auricles is very finely crenulated, and all round the ventral part it is more coarsely denticulate. The

colour of the upper valve is uniformly an intense purple red, the lower one being somewhat paler.

Of the three specimens obtained by Mr. Powell, after whom I have much pleasure in naming this species, one was detached from a flat smooth surface, and from its flattened side, the rest of the surface slopes outward. The other two examples are much more coated with nullipores, worm-tubes, etc., and apparently have only had a very irregular attachment.

Helix (Geotrochus) hedleyi.

Testa imperforata, polita conica, ad peripheriam acute angulata, infra plana, cinnamomea, inferne castanea, ad carinam linea angusta opaca lutea cincta, zona angusta castanea infra suturam in anfractu ultimo ornata lineis incrementi perobliquis tenuibus striata; anfractus 7, supremi 4 convexi, sequentes duo plani, ultimus haud descendens, supra angulum læviter concavus, infra fere planus, striis radiantibus incrementi tenuibus, lineisque paucis irregularibus concentricis impressus; apertura obliqua, angusta, albida ad carinam canaliculata, effusa; peristoma castaneo-marginatum, margine superiore expanso, inferiore valde reflexo, incrassato, supra umbilici regionem dilatato.

Alt. 30 millim., diam. maj. 36, min. 30.

Hab. : Probably New Guinea.

This handsome species is elevately conical, the almost straight outlines forming at the apex an angle of about 60 degrees. It is sharply keeled at the periphery and almost quite flat beneath. The upper and lower surfaces present a strong contrast of colour. The base is uniformly dark chestnut brown, whereas the rest of the shell is of a yellowish buff tint, excepting a fine opaque luteous line upon the keel, which revolves up the spire forming a distinct margination above the suture, and a narrow dark brown zone beneath the suture. The first four whorls are rather convex, the next two are almost flat, and the last or body-whorl is distinctly concave above the carina. The surface is glossy, and exhibits distinct, very fine, oblique and flexuous lines of growth, in addition to which, under a powerful lens, minute but feeble spiral striæ are

observable. The base is similarly sculptured, but the radiating lines of growth have a rather coarser appearance. A few indented irregular concentric lines upon the base, and a few short oblique ones upon the body-whorl above the keel and behind the lip, may be individual rather than specific characters. The aperture is oblique, whiteish within, and much pointed and channelled in front at the termination of the keel. The upper lip is thin, expanded, and tinged with dark brown at the edge; the lower also is similarly coloured, is strongly reflexed, and in the umbilical region somewhat expanded. The terminations of the peristome are remote, but connected by a thin layer of callus upon the flat surface between.

The single specimen, all that is known of this species, has recently been purchased by the British Museum. Until lately it formed part of a collection which was got together many years ago, and which remained packed up for fifty or sixty years. Although no locality accompanied the shell, we can safely assume, from its resemblance to allied forms, that it was an inhabitant of New Guinea or some adjacent island. *H. ferussaci* of Lesson, and *H. exsultans* of Canefri, are the nearest allies. Neither of these species is nearly so large as that now described. The former is higher in proportion to the width, and is described and figured as being of an uniform rich chestnut colour, excepting the golden yellow carina and edging to the suture. On the contrary *H. hedleyi* is much wider in proportion to the height, and the difference of colour between the upper and lower surfaces is most marked. Besides this the aperture in Lesson's shell appears to be dark brown, whereas in this it is white. From *H. exsultans* the present species is distinguished, not only by its considerably larger size, but also by a difference of colouring and the greater flatness of the whorls and the base.

I have named this interesting form after Mr. C. Hedley, author of several valuable papers on terrestrial mollusca of Australia, New Guinea, etc.

NOTICE NÉCROLOGIQUE

SUR J. R. BOURGUIGNAT,

*Membre honoraire de la Société de Conchyliologie de la Grande Bretagne
et de l'Irlande.*

Le 5 Avril dernier expirait à Saint-Germain-en-Laye (Seine-et-Oise), le savant malacologiste J. R. Bourguignat, l'auteur bien connu de nombreux travaux et qui, par ses œuvres, a eu directement ou indirectement une influence considérable sur la marche scientifique de ce demi-siècle.

M. Bourguignat est né à Brienne-Napoléon (Département de l'Aube), le 29 Août 1829. Après l'achèvement de ses études dans la ville de Troyes, il vint à Paris en 1850, dans l'intention de suivre la carrière du Droit ; mais poussé par un puissant attrait vers les Sciences naturelles, il abandonna bientôt le Droit pour ces dernières études. Son premier travail, qui parut en 1852, constitue l'une des parties scientifiques du voyage en Orient de M. de Saulcy, membre de l'Institut. Dès l'année suivante, au moment de la création de la chaire de Paléontologie, il était appelé par le célèbre professeur Alcide d'Orbigny, à la place de préparateur de ce cours au Muséum de Paris, place qu'il conserva jusqu'à la mort de ce savant illustre, dont il fut l'aide et l'ami.

Ce fut en 1860, qu'il se démit de ses fonctions en faveur de M. le Dr. Paul Fischer, qui les occupe encore actuellement.

A partir de cette époque, poussé par l'ardeur du travail, M. Bourguignat s'adonna sans réserve aux études scientifiques ; chaque année il fit paraître de nombreux mémoires sur l'Archéologie, l'Epigraphie, la Botanique, la Géologie, l'Ostéologie, la Paléontologie et la Malacologie ; c'est surtout cette dernière, sa science favorite, qui servit de thème à ses multiples ouvrages, et c'est surtout au point de vue malacologique qu'il est intéressant d'étudier cet auteur et de montrer les évolutions scientifiques que l'étude, la réflexion et le travail ont apporté dans la série de ses travaux sur cette matière.

La Malacologie, à l'époque où M. Bourguignat entreprit ses publications, était une science mal assise ; à peine datait-elle, du reste, d'une cinquantaine d'années. Ou avait alors l'habitude d'envisager les formes spécifiques sous un aspect tout particulier et l'on croyait faire preuve de savoir en agglomérant, sous un même nom des séries entières de formes le plus souvent très-dissemblables, et en allongeant des kyrielles de citations synonymiques ordinairement inexactes. M. Bourguignat a eu le mérite incontestable d'appliquer des règles fixes dans la manière d'entendre l'espèce en Malacologie et il la considère comme 'une chose abstraite, mais qui se détermine cependant, pour le besoin zoologique, par la présence de caractères constants.'

Il est bien certain, d'après M. Bourguignat, que ces caractères sont, dès lois, les résultants des influences vitales et climatologiques, et il estime qu'il en faut trois pour discerner une espèce d'une espèce voisine.

Cette méthode a l'avantage indiscutable de supprimer l'arbitraire en matière de classification, puisqu'il est bien démontré que, dans la pratique, il est impossible ou tout au moins très-difficile de spécifier la part d'ue à une influence quelconque dans la variation des espèces malacologiques. Il est également impraticable de pouvoir affirmer en toute sécurité que deux ou plusieurs formes, considérées comme distinctes, dérivent ou ne dérivent pas d'une forme ancestrale commune.

La nouvelle méthode, appliquée par son auteur, l'a amené à des découverts inattendues.

Avec les formes sur lesquelles, à force de patience et d'étude, il est parvenu à lire les signes résultant du froid, de la chaleur, de la sècheresse où de l'humidité, il est arrivé, en remontant des effets aux causes, à rétablir les anciennes climatologies, comme celles du bassin de la Seine aux époques préhistoriques, à chiffrer les dates des dépôts, ainsi qu'il l'a fait pour les dépôts inférieurs des dolmens de l'Algérie, et même à

recomposer la topographie d'un pays, comme il a réussi à le faire pour la colline de Sansan, à l'époque miocène.

M. Bourguignat, nommé chevalier de la Légion d'honneur, était l'un des plus féconds, sinon le plus fécond, des auteurs de ce siècle. C'était un travailleur infatigable et sa méthode, bien que décriée dans son application par des ennemis acharnés, a été suivie plus ou moins inconsciemment par la plupart des malacologistes de quelque valeur, dont plusieurs se trouvent aujourd'hui au point où M. Bourguignat en était il y a quelques vingt ans.

Ce savant avait réuni une collection des plus remarquables de coquilles terrestres et fluviatiles du système Européen, collection dont il a fait don, lors des premières attaques de la cruelle maladie qui l'a emporté, au Musée d'Histoire Naturelle de Genève, afin qu'elle complétât en quelque sorte, la collection du célèbre Lamarck, que possède également cet établissement.

Depuis quelques années, il avait joint à ses études la faune de l'Afrique équatoriale, notamment de la région des Grands Lacs du centre de ce continent. Il a publié sur ce sujet des travaux importants. Les matériaux qu'il avait recueillis à cet effet, ont été donnés, par un acte d'intelligente générosité, au Muséum de Paris.

M. Bourguignat, dont la juste susceptibilité avait été souvent froissée par les attaques de ses ennemis, avait aussi de nombreux amis dévoués, qui avaient pu apprécier sa constante bienveillance, sa libéralité et son grand désintéressement scientifiques. En 1883, il avait été le promoteur de la Société Malacologique de France, qu'il avait constituée avec le concours de MM. Ancey, Coutagne, Fagot, Servain, Hagenmüller, Letourneux, Poirier, Mabilie, Saint-Simon, de Rochebrune et Locard. Il me comptait au nombre de ses amis depuis dix ans et j'ai pu apprécier souvent que le terme d'amitié n'était point pour lui un vain mot. Qu'il me soit donc permis d'unir mes regrets personnels à ceux de tous les amis d'une science à laquelle M. Bourguignat a consacré toute sa vie!—C. F. ANCEY.

A CONTRIBUTION TO THE AUTHENTICATED RECORDS OF DERBYSHIRE.

By LIONEL E. ADAMS, B.A.

The following list of slugs may interest Derbyshire collectors. With the exception of *L. flavus* they have been identified by my friend, Mr. W. Denison Roebuck.

Arion ater. Common throughout the county.

A. ater. v. luteo-albescens. Clifton.

A. ater v. plumbea. Rowsley.

A. subfuscus. Clifton and country south of Ashbourne. As yet I have not taken this species in any limestone district.

A. subfuscus v. brunnea. Clifton.

A. subfuscus v. rufo-fusca. Clifton.

A. hortensis. Throughout the county.

A. minimus. Clifton and Rowsley, 1889.

A. circumscriptus. Throughout the county.

Limax agrestis. Very common throughout the county.

L. agrestis v. nigra. Clifton.

L. arborum. Common along the walls and banks on the road between Hathersage and Bakewell.

L. arborum v. nemorosa. One or two specimens of this variety with the above.

L. maximus. Common in a cellar at Clifton.

[**L. flavus.** I have *heard* of this, described as 'a large yellow slug with a shell, in the cellar.' Clifton].

Arion ater var. **bicolor** in **Devonshire** and the **Isle of Man**.—I have lately had the pleasure of seeing, through the kindness of my friend, Mr. Lionel E. Adams, B.A., a number of fine examples of this beautiful variety, which he and Mr. C. Oldham found about the end of August in South Devon, where they failed to observe the typical form. About the same time I received another fine example, taken at Douglas, Isle of Man, by Mr. F. Taylor.—W. DENISON ROEBUCK, Leeds.

SHELL HUNTING IN MERIONETHSHIRE.

BY G. W. CHASTER.

(Read before the Conchological Society, July 27th, 1892).

In June last, when enjoying a short holiday in Merionethshire, I devoted part of my time to searching for mollusca, and as will be seen from the appended list, the captures were by no means poor as regards either number or rarity.

For a few days I met with nothing very striking, taking merely such forms as *Hyalinia excavata*, *H. glabra*, *H. radiatula*, *Limax flavus*, etc.

However, one day when in a rather out-of-the-way neighbourhood matters all at once began to improve. *Succinea putris* was seen on rushes, and *Helix fusca* on the leaves of the Meadow-sweet, and on searching at this spot *Helix lamellata* and *Vertigo substriata* were taken. Being only able to spend a very short time here, as the ground seemed to promise so well, one of the calico bags I always carry about was filled with material for further examination. This yielded a truly splendid harvest. In addition to the forms mentioned, *Helix aculeata*, *H. pygmaea*, *Pupa ringens*, *Vertigo edentula*, *H. pura*, *H. radiatula*, *H. alliaria*, *H. crystallina*, *H. fulva*, *Cochlicopa lubrica*, *Carychium minimum*, and to my delight several specimens of *Acicula lineata* var. *alba*.

To obtain a further supply of this conchological treasure I visited the spot again. Here was taken a single specimen of *H. nitida*. In a few minutes I was taking *Acicula* in such abundance as I suppose has rarely been noted before. The beautiful cream-coloured mollusc was very conspicuous, and in two hours I took 98 specimens. The animals were frequently found in groups of 4, 5, or even 6 together.

With regard to the exact habitat I am anxious to examine Mr. Heathcote's Fleetwood locality before writing on this

subject, as in certain respects, judging from the published account, there is a similarity between the two places. Although in the neighbourhood of the spot the mollusc was taken in the habitat usually given, viz., 'among decayed leaves,' it was only, as is usual, sparingly. Should I find, as I am inclined to suspect, that *Acicula* affects by preference another habitat, it will be duly announced.

Altogether 34 species of land and fresh water shells were taken, viz. :—

<i>Succinea putris</i>	<i>Helix arbustorum</i>
* <i>Vitrina pellucida</i>	„ <i>rufescens</i>
<i>Hyalinia cellaria</i>	„ <i>hispida</i>
* „ <i>alliaria</i>	„ <i>fusca</i>
* „ <i>glabra</i>	„ <i>rotundata</i> and var. <i>alba</i>
„ <i>nitidula</i>	* „ <i>pygmæa</i>
* „ <i>pura</i> and var.	* <i>Pupa ringens</i>
„ <i>margaritacea</i>	* <i>P. cylindracea</i> and v. <i>edentula</i>
„ <i>radiatula</i> and var.	* <i>Vertigo substriata</i>
„ <i>viridescens-alba</i> .	„ <i>edentula</i>
* „ <i>nitida</i>	* <i>Balea perversa</i>
„ <i>excavata</i> and var.	<i>Cochlicopa lubrica</i>
„ <i>vitrina</i>	<i>Carychium minimum</i> and var.
* „ <i>crystallina</i>	„ <i>opaca</i>
„ <i>fulva</i>	* <i>Acicula lineata</i> var. <i>alba</i>
* <i>Helix lamellata</i>	<i>Limnea peregra</i>
„ <i>aculeata</i>	„ <i>truncatula</i>
„ <i>aspera</i>	* <i>Pisidium pusillum</i>
„ <i>nemorialis</i>	* „ <i>milium</i>

of which those marked with an asterisk have not been noticed by me as recorded for the county.

An afternoon was spent in shore hunting for marine mollusca, but the results were disappointing. Almost everywhere the boulders were cemented together by the tubes of *Sabella alveolata*, and under the few which were free only *Chiton marginatus* and two or three equally common things were taken. Indeed the only marine shell worthy of mention is *Lepton clarkie*, which I had never before gathered.

The University of Edinburgh and the ex-President of the Conchological Society.—Members of the Society will be much interested in their late President, Rev. R. Boog Watson, having received from his University the honorary degree of LL.D. In presenting Mr. Watson to the Vice-Chancellor of the University, on the 14th of April last, Professor Dr. Kirkpatrick, Dean of the Faculty of Law, gave the following account of Mr. Watson's scientific career :—

Educated in Scotland, England, France, and at this University, Mr. Watson took his B.A. degree with honours in Mathematics in 1846, and afterwards served as military chaplain throughout the Crimean War and the Indian Mutiny. He next spent nine years in Madeira, when he enjoyed valuable opportunities of scientific study. For more than thirty years past he has been a most devoted and distinguished student of Natural Science, particularly of Geology and Conchology, in which last he is one of the highest living authorities. Among his many valuable contributions to science are the voluminous and learned contents of vol. xv. of the 'Challenger' Reports, extending to 756 pages, Geological Papers, published in the Transactions of the Royal Society of Edinburgh, the Geological Society of London, and the Natural Science Society of Lünzburg, and conchological papers published by the *Journal de Conchyliologie* of Paris, the British Association, the Linnean Society, and the Conchological Society of Great Britain and Ireland. Not only has Mr. Watson been a leading member of these various learned bodies for many years, but he has filled the high post of President of the Conchological Society, of which he is still Vice-President, and he has also been honoured with three military medals in recognition of his important public services. On these grounds the Rev. Robert Boog Watson, B.A., F.R.S.E., F.G.S., etc., is conspicuously worthy of the highest honour which his *Alma Mater* has in her power to bestow.

LAND AND FRESHWATER SHELLS AT KARACHI.

BY GERALD W. ADAMS.

(Read before the Conchological Society, 10th August, 1892).

Happening to make a short stay in Karachi, I, in company with two other doctors attached to ships lying in the harbour, made an excursion of about fifteen miles across the desert to visit the 'Alligator Tank.' In the neighbourhood of this there is a plantation of mangoes, dates, and cocoanut palms, a Moslem Temple and tombs, some boiling sulphur springs, and, what the natives call the 'Milk Spring,' the water of which is opaque white, possibly owing to the presence of a carbonate or sulphate of lime. All this forms an oasis in the desert—a level waste of sand extending for several miles, bearing only here and there Cactuses, a Euphorbia and a few palms—not an ideal hunting ground for land and freshwater shells. However, as I walked about the place my attention was directed to some small white objects lying on the sand, which upon examination proved to be dead bleached shells of various species. These have been identified as—

Bulimus chion, which was plentifully distributed over a large area.

Bulimus pullus, less plentiful.

Planorbis (? sp.) indistinguishable from *corneus*.

Succinea (? sp.) exactly like our *elegans*.

Bithynia (sp. ?) very near *tentaculata* but smaller.

Melania (? sp.)

And two other species indistinguishable from *Limnæa glabra* and *Achatina acicula*.

All the shells were found in the neighbourhood of 'Nullahs' leading into the river Liari, which is dried up throughout the year, except for about six weeks in the rainy season, when it becomes a broad river.

The river flows across the desert for nearly a hundred miles before it reaches the spot where the shells were found, and it is probable that they were carried for this distance from the higher ground where the river takes its rise.

In Karachi itself I captured a single live specimen—a slug, chocolate brown, three inches long, nearly one broad, faintly carinated along the whole of the back, along which ran a delicate, white, dotted line spreading out at the extremities to more distinct dots. Sole lemon-coloured. The whole body and head enveloped by a broad, overhanging mantle, from under which the tentacles alone protruded. I observed no spiracle, and could find no shell by dissection. Its form was very unlike that of our British slugs, being very flat and broad, a transverse section having the form of a very depressed isosceles triangle, the base being three times the height. The upper surface was smooth, showing a few minute punctiform depressions. My brother suggests that it belonged to the genus *Onchydium*. It was doubtless imported with the soil into the private garden where I found it.

The soil in Karachi is eminently unsuitable for shells, as at a no very remote period the whole district was covered by the sea, and the surface sand is so impregnated with salt that at night it forms a sticky mud when the dew falls.

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

P R O C E E D I N G S .

199th MEETING, TUESDAY, MAY 10th, 1892.

Held at the Philosophical Hall, Park Row, Leeds.

Mr. John W. Taylor, F.L.S., Vice-President, in the Chair.

Library Purchase announced : Razoumowsky, *Histoire Naturelle du Jorat*, 1789, 2 volumes.

Donations to Library announced and thanks voted : From the respective Editors, Trustees, Societies, and Authors—Naturalist for May ; L'Echange Revue Linneenne, Nos. 73—76 and 78—80 ; Feuille des Jeunes Naturalistes for May ; Records of the Australian Museum, Vol. 1, Nos. 4-

7 and 10, and Contents and Index to Vol. 1; J. Brazier's Catalogue of Marine Shells of Australia and Tasmania, Part 1, Cephalopoda, 1892; J. Brazier's List of Cephalopoda in the Collection of the Australian Museum, 1892; W. Denison Roebuck's Additions to the Authenticated Comital Census of the Land and Freshwater Mollusca of Scotland, 1892; Aleyn Lyell Reade's Paper on Shells at Crosby (in Merchant Taylors' Review for April 1892); R. Bergh's Die Nudibranchiata holohepatica porostomata, Dec. 1891; 24th Bericht der Oberhessischen Gesellschaft für Natur- und Heilkunde (containing List of Mollusca of Giessen, by Karl Eckstein); and Handbook for Leeds and Airedale, 1890.

Donations to Collections announced and thanks voted:

From Hugh Richardson: *Clausilia papillaris*, and *Cl. solida*, from Castellamare, Bay of Naples; *Helix pisana*, *Cyclostoma elegans*, and other species from the Temple of Neptune at Pæstum, Travertine.

Papers Read:

'Description of a New Species of Spondylus and a New Helix,' by Mr. Edgar A. Smith, F.Z.S [printed in 'J. of C.,' July, p. 70].

Notes on '*Vertigo pusilla* in Lancashire' [printed in 'J. of C.,' January, 1892, p. 7]; '*Helix aspersa* monst. *sinistrorsum* in the Isle of Man' [printed at p. 24]; 'Observations on the Reproduction of the Dart, during an attempt to breed from a sinistral *Helix aspersa*' [printed in 'J. of C.,' April, 1892, p. 33]; '*Limnaea stagnalis* monst. *sinistrorsum*' [printed at p. 41]; and '*Helix virgata* monst. *sinistrorsum* from Colwyn Bay' [printed at p. 44], all by Mr. Robert Standen.

Two Notes by Mr. Lionel Adams, B.A., on '*Planorbis albus* monst. *scalariforme* at Penistone' [printed in 'J. of C.,' January, 1892, p. 7]; and on '*Helix rotundata* var. *alba* at Conisborough' [printed in 'J. of C.,' April, 1892, p. 38].

Three Notes by Mr. Theo. D. A. Cockerell, F.Z.S., F.E.S., on '*Arion minimus*=*intermedius* Norm.' [printed in 'J. of C.,' January, 1892, p. 31]; on 'New Varieties of American Mollusca' [printed in 'J. of C.,' April, 1892, p. 39]; and on '*Zonites glabra* var. *viridula*=*viridans*' [printed at p. 44].

'List of Mollusca found at Meiringen, Switzerland,' by Rev. J. W. Horsley, M.A. [printed in 'J. of C.,' January, 1892, p. 32].

A Note by Mr. Thomas Rogers, 'On the Viviparous Nature of *Balea*' [printed in 'J. of C.,' April, 1892, p. 40].

A Note by Miss F. M. Hele, on 'Sinistral *Helix aspersa* at Bristol' [printed in 'J. of C.,' April, 1892, p. 41].

Exhibits:

The Recorder exhibited an example of the unicolorous reddish form of *Limax flavus*, sent from Pickering by Mr. John Braim, and a large number of land and freshwater mollusca from Scotland, including many new comital records, sent by Mr. William Evans, F.R.S.E., and which will all be fully reported on in the 'Annals of Scottish Natural History.' The localities were all in South Perthshire and Stirlingshire.

The Chairman showed examples of *Testacella haliotideia* from Mathem near Chepstow, Monmouthshire, sent by Mr. E. J. Lowe, F.R.S., who states that it is numerous in that locality.

The Society's Ex-President.

The Secretary called attention to the fact of the honorary degree of LL.D. having been conferred upon the Rev. R. Boog Watson, B.A., ex-President of the Society, by the University of Edinburgh, and it was cordially agreed to record on the minutes an expression of the pleasure which it gave the Society to congratulate the new-made Doctor upon the honour.

200th MEETING, WEDNESDAY, JUNE 1st, 1892.

Held at the Philosophical Hall, Park Row, Leeds.

Mr. John W. Taylor, F.L.S., Vice-President, in the Chair.

Donations to Library announced and thanks voted: From the respective Editors and Societies: The Naturalist for June 1892; Proceedings of Royal Physical Society of Edinburgh, Vol. XI., Part I, 1890-91.

Donations to Collections announced and thanks voted:

From Miss Mary Kimber: fourteen species of shells from Newbury, Berks.; three from Burghclere, Hants., and one from Stroud, Gloucestershire.

From Mr. Percy H. Grimshaw: An example of *Hyalinia alliaria* found on a frond of Maiden-hair (*Adiantum capillus-veneris*) at Burley-in-Wharfedale.

Candidate Proposed for Membership:

Mr. John Burman Rosevear (proposed by Mr. G. K. Gude and seconded by Mr. H. Wallis Kew, F.E.S.).

Exhibits:

On behalf of the Rev. George Gordon, LL.D., was exhibited *Helix caperata* from Inverugie, being a new species record for North Aberdeenshire.

The Recorder exhibited various land and freshwater shells from Settle, Horton-in-Ribblesdale, Rokeby and the Greta, Eggleston Abbey, etc.

On behalf of Mr. Arthur Mayfield were shown *Helix caperata* var. *alba* from Drayton, *Pupa marginata* from Ringland, *P. umbilicata* var. aff. *albina* from Harlham, and *Hyalinia nitidula* from Lakenham.

On behalf of Mr. J. Benj. Beckett was exhibited a piece of wood from a pile of the harbour at Yarmouth, showing the borings of *Teredo navalis*. At one time the *Teredo* was a source of great trouble and expense to the Yarmouth Harbour Authorities; their depredations causing immense damage to the wooden piles, which had continually to be renewed. Now, however, they have almost if not entirely departed from that locality, and Mr. Beckett suggests that this may be accounted for by the fact that of late years the sea at ebb tide has receded further, and has not come up at flood so far as formerly, which of course causes more fresh water to find its way to the mouth of the river. The sewage, too, which is now all turned into the river, may have had some effect upon the *Teredo*.

201ST MEETING, WEDNESDAY, JULY 27th, 1892.

Held at the Philosophical Hall, Park Row, Leeds.

Mr. John W. Taylor, F.L.S., Vice-President, in the Chair.

Donations to Library announced and thanks voted: From the respective Editors, Societies, Trustees, and Authors: The Naturalist for July, 1892; Feuille des Jeunes Naturalistes for June and July; Catalogue de la Bibliothèque, fasc. 15, May, 1892; L'Echange Revue Linneenne for June and July; Revue Générale des Sciences Pures et Appliquées for May and July, 1892; Transactions and Annual Report of Manchester Microscopical Society for 1891; Journal of Royal Society of New South Wales, Vol. 25, 1891; Abstracts of Proceedings of Linnean Society of New South Wales, March and May, 1892; Records of the Australian Museum, Vol. 2, No. 1, April, 1892; J. Brazier's Catalogue of Marine Shells of Australia and Tasmania, Part 2, Pteropoda, 1892; Walter Crouch's Notes of Two Days' Trawling and Dredging in the River Crouch; T. D. A. Cockerell's Notes on Australian Slugs; M. Cossmann's Réponse aux Observations de M. E. Vincent sur le *Gilbertia inopinata* Morlet; M. Cossmann's Extraits de l'Annuaire Géologique Universel (Gastéropodes) for 1889 and 1890.

From Mr. G. K. Gude: The following reprints of papers published in the Journal of the Asiatic Society of Bengal: G. E. Fryer's Contribution to our Knowledge of Pelagic Mollusca, 1869; W. T. Blanford's Monograph of Himalayan, Assamese, Burmese, and Cingalese Clausiliæ, 1872, with F. Stoliczka's Postscript, 1872; F. Stoliczka's paper on the Land Shells of Penang Island, with descriptions of the animal and anatomical notes, first part, Cyclostomacea, 1872; H. H. Godwin-Austen's Descriptions of nine species of *Alycæine* from Assam and the Naga Hills, 1874; his Descriptions of the species of *Alycæine* known to inhabit the Khasi Hill Ranges, 1871; his Descriptions of New Species of *Diplommatina* from the Khasi Hills, 1870; W. T. Blanford's Note on the Molluscan Genera *Calostele* Benson and *Francesia* Paladilhe, and on some species of Land Shells from Aden, 1875; W. Theobald's Descriptions of New Species of Unionidæ, 1873; G. and H. Nevill's Descriptions of New Marine Mollusca from the Indian Ocean, 1874 and 1875; H. H. Godwin-Austen's Descriptions of New Operculated Land Shells belonging to the genera *Craspedotropis*, *Alycæus*, and *Diplommatina*, from the Naga Hills and Assam, 1875.

Donations to Collections announced and thanks voted:

From Miss J. E. Linter: A valuable series of Indian and Ceylonese Shells, including *Tanalia loricata* Rve., *T. fardneri* Rve., *Paludomus palustris* Layard, *Bithynia marginata* Lam., *Cataulus templemani* Pfr., and *Philopotamus clavatus* Rve., from Ceylon; *Unio olivarius* Lea, *Limnæa auricularia*, *Helicarion* sp., *Unio marginalis* and variety, and *Opisthotoma macrostoma* W. Blanf., from India; *Limnæa stagnalis*, *Napæus candelaris* Pfr., *N. domina* Ben., and *Corbicula kashmiriensis* Desh., from Kashmir; *Paludomus regulatus* Ben., *Vivipara heliciformis* Frau., *Melania lineata* Gray, *Cryptosoma præstans* Gould, *Unio pugio* Ben., *U. crispisulcatus* Ben., *Melania variabilis* Ben., *M. tuberculata* Müll., *Monochondyla salviniana* Gld., *M. crebristriata* Anth., *Neritina bengalensis* Chemn., *N. cornucopie*

Ben., and *Pupina blanfordi* Theob., from Pegu; *Clausilia philippiana* Ben., *Palaina angulata* Theob. and Stol., *Hydrocena blanfordiana* Stol., *Plectophyllis achatina* Graf., and variety, *Hybocystis gravis* Ben., *Cyclophorus speciosus* Phil., and a species of *Napaeus*, from Moulmein; *Helicarion flemingii* Pfr., from Mari; *Clausilia insignis* Fld., and *Vivipara doliaris* Gould, from Tavo; *Neritina verrottetiana* Petit, from the Nilghiri Hills; *Succinea daucina* Pfr.?, *Stenothyra deltae* Ben., and *Assiminea francesie* Gray, from Calcutta; *Bithynia travancoricus* Ben., from Travancore; *Alyceus sculptilis* Ben., from Theitmio; *Hydrocena sarrita* Ben., from Cherrapunji; *Pupina artata* Ben., from Birmah; *Hypselostoma tubiferum* Ben., from Ava; *Clausilia waageni* Stol., and *Cl. cylindrica* Gray, from W. Himalayas; *Limnaea truncatula* Müll., from Spiti; *Palutonus stephanus* Ben., from the Khasi Hills; *Limnaea acuminata* Lam., from Hyngola; *Succinea girnarica* Theob., from Kattiawar; and *Scaphula ulox* Ben., from the Ganges.

From Mr. Edward Self: *Testacella scutulum* from Backhouse's nurseries at Holgate, York.

From Rev. George Gordon, LL.D.: *Helix caperata* from Inverugie, North Aberdeenshire.

From Mr. Frank Turton: Remarkable distorted example of *Limnaea peregra* from Gunthwaite, near Penistone, Yorkshire.

From Mr. Richard Barnes: Various land and freshwater shells from Yorkshire localities.

From Mr. W. Denison Roebuck, F.L.S.: A large number of land and freshwater shells from Yorkshire localities.

New Member Elected:

Mr. John Burman Rosevear, Roselea, 51, Crouch Hill, London, N.

Candidate Proposed for Membership:

Mr. John G. Shillito (proposed by Rev. Charles Crawshaw and seconded by Mr. Lionel E. Adams, B.A.).

Decease of Member announced.

The death of one of the Society's Life Members, Monsieur J. R. Bourguignat, which took place in April last, was announced, and an obituary notice, sent by Mr. C. F. Ancey, was read.

Papers Read:

A paper on 'Shell Hunting in Merionethshire,' by Mr. G. W. Chaster, M.R.C.S., of Southport, was read [printed in 'J. of C.,' July, 1892, p. 78]. In the discussion on this paper, it was pointed out that the value of the list would have been much increased had the localities in which the shells were obtained been stated.

A paper 'On some Shells from Eastern Bolivia and Western Brazil,' by Mons. C. F. Ancey, was read. It included descriptions of several species as new to science, and was accompanied by drawings of two of them [printed in 'J. of C.,' July, p. 90].

A 'Notice Nécrologique de M. J. R. Bourguignat,' by Mons. C. F. Ancey, was also read [printed in 'J. of C.,' July, p. 74].

Exhibits :

The Chairman exhibited on behalf of Rev. W. L. W. Eyre, M.A., examples of various forms of *Sphærium lacustre* from Hampshire, and *Limnæa palustris* vars. *elongata* and *stricta* from near Hull.

On behalf of Mr. R. Rogers were shown a large number of shells from Yardley Hastings, Northants.

The Chairman exhibited a collection of shells collected by Mr. G. W. Chaster in Merionethshire, to illustrate that gentleman's paper.

On behalf of Mr. H. Wallis Kew, F.E.S., were shown *Limnæa peregra*, *L. truncatula*, *Sphærium lacustre*, and a *Pisidium* from an isolated pond at Welton-le-Wold, Lincolnshire.

On behalf of Mr. Charles Oldham was shown a small example of *Arion minimus* from Buxton, Derbyshire.

202nd MEETING, WEDNESDAY, 10th AUGUST, 1892.

Mr. J. W. Taylor, F.L.S., Vice-President, in the Chair.

Library Purchase announced : Annals of Lyceum of Natural History of New York, vols. 1 (in two parts) and 2, 1824—1828.

Donations to Library announced and thanks voted : The Naturalist for August; Feuille des Jeunes Naturalistes, Août; Proc. and Trans. Nova Scotian Institute of Science, 2nd series, vol. 1, part 1, 1891; Abstract Proc Linn. Soc. of New South Wales, 29 June; and List of Members of American Association of Conchologists, No. 2, July 18, 1892 (all from the respective Editors and Societies).

Donations to Collections announced and thanks voted :

From Mr. R. S. Ferguson, F.S.A. : Shells (*Limnæa peregra* and *Planorbis marginatus* in abundance) and a block of material containing them, found in digging the foundation of a house in Carlisle, supposed to be the remains of the city ditch, outside the wall.

From the Rev. W. C. Hey, M.A. : Examples of shells of the genera *Helix*, *Planorbis*, *Bythinia*, and *Limnæa* (including *L. auricularia*) from Kashmir, collected by Mr. W. H. Cobb.

From Mr. J. Darker Butterell : Several species of *Helix* from Langtoft on the Wolds, East Riding of Yorkshire.

New Member Elected :

Mr. John G. Shillito, 20, Elmore Road, Sheffield.

Candidates Proposed for Membership :

Messrs. Bartlet Spau (proposed by H. K. Jordan, F.G.S., and J. T. Marshall); Tom Brown (proposed by Rev. W. L. W. Eyre, M.A., and John A. Hargreaves); and R. J. Lechmere Guppy (proposed by Edgar A. Smith, F.Z.S., and John W. Taylor, F.L.S.).

Papers Read :

A paper by Mr. Gerald W. Adams, M.R.C.S., upon 'Land and Fresh-water Mollusca at Karachi,' [printed in J. of C., July, pp. 81—82].

A note by Mr. J. B. Beckett upon Carnivorous Propensities as observed by him in *Bythinia tentaculata* and *Planorbis marginatus*, near Yarmouth.

A 'List of Slugs found in Derbyshire,' by Mr. Lionel E. Adams, B.A. [printed in J. of C., July, p. 77].

Exhibits :

On behalf of Mr. Charles Oldham were shown living examples of *Arion minimus* from Glenfield and the banks of Groby Pool, both near Leicester.

Mr. W. Denison Roebuck, F.L.S., showed shells from the mud-cliffs near Withernsea, E. Yorkshire, in the marl-deposits in which they occurred, including *Valvata piscinalis*, *Limnæa peregra*, *Sphærium corneum*, and *Pisidium pusillum*, all in abundance; and also a single example of *Limnæa stagnalis*, this collected by Mr. Edwin Hawksworth.—W.D.R.

MANCHESTER BRANCH.

Meeting in the Museum, Owens College, September 8th, 1892.

Mr. Thos. Rogers in the chair.

Papers Read :

'Notes on the Norman and Alder collections,' by R. Standen.

'On the genus *Thelidomus* Swainson'; and 'On the occurrence of *Achatina acicula* in an ancient Grecian lachrymatory from Corfu,' by R. D. Darbishire.

Exhibits :

By Mr. Ed. Collier : Types of the various sections of *Cylindrella*, with explanatory remarks.

By Mr. F. G. Pearcey : *Chiton marmoreus* from Firth of Clyde, the largest specimen $2\frac{1}{2}$ inches in length, and *Chiton cinereus*, *ruber*, and *marginatus* from same locality, with description of habitat.

By Mr. F. Collier : *H. nemoralis* vars. *rubella* and *castanea* of unusual beauty from Dovedale, Derbyshire.

By Messrs. Moss and Cairns : A series of extremely small *H. nemoralis* and varieties from Hawick, Scotland; varieties of *H. ericetorum* and *Bulimus acutus*, *H. rotundata* var. *alba*, *Succinea elegans*, *Pupa ringens*, and *Carychium minimum*, from the Isle of Man, the last three species being new additions to the Manx list. *Ampullaria cornu-arietis*, with photographs of palate, *Bulimus glaber*, *B. stramineus*, *B. vincentinus* and eggs of *B. oblongus*, some of which had hatched out on the passage, all from Trinidad, and received alive by Mr. Moss.

By Mr. F. Taylor : *Zonites excavatus*, *Z. fulvus*, *Z. alliarius*, *Z. crystallinus*, and *cellarius*, *C. lubrica*, *Vertigo substriata* and others, from Holden Clough; and *Planorbis nautilus* monst. *scalariforme*, from Fitton Hill, Oldham; new localities.

By Mr. T. Rogers : An enormous specimen of *Pterocera lambis*, from West Indies; and *Pecten lubernicus*, from the Adriatic.

Mr. Moss also showed a fine series of *Acme lineata*, received from Dr. Chasters, of Southport, most of them being var. *alba* Jeff. Dr. Chasters recently collected 250 living specimens of this species in Merionethshire, in a similar locality to that at Fleetwood.—R. STANDEN, Hon Sec. of Branch.

Extraordinary finds of *Vertigo pygmæa* Drap. at Clitheroe, Lancashire, and Beezley, Yorkshire.—In September, 1890, Messrs. W. Moss and R. Cairns took *Vertigo pygmæa* in great quantity in an old limestone quarry near Clitheroe. The slope of this quarry is covered with loose debris, barren of any kind of vegetation, and the *Vertigos* occur under the stones in company with *Z. fulvus*, *H. pygmæa*, *H. pulchella*, *Coch. lubrica*, *V. pellucida*, and *B. obscurus*, the latter very fine and plentiful. Upwards of 200 *Vertigos*—all fine, mature specimens—were collected in about an hour. The Manchester Branch made an Excursion to this spot on the 13th of September last, and upwards of 3,000 *Vertigos* were obtained, a number which could readily have been doubled had time permitted. As many as thirty specimens were taken from underneath one small stone. What the animals can find to feed upon is a mystery, the stones being quite bare; but probably they find support in some small microscopic plants. Mr. Moss also discovered a very similar congregation of *V. pygmæa*, in an old quarry, much resembling the Clitheroe one, at Beezley, near Ingleton, Yorkshire, during August last. In a very short time he collected several hundreds of specimens, all living, from underneath the loose stones and debris of the place, but found no other species living there. He showed these at the September meeting of the Branch.—R. STANDEN, November 16th, 1891.

Pupa ringens in Cheshire.—This species turned up in considerable quantity in a wood at Marple on the occasion of the Whit-week excursion of the Manchester branch, on June 6th. It occurred in a very damp situation amongst moss and *Jungermannia*, in company with *Helix aculeata*, *Carychium*, *Vertigo edentula*, *Zonites purus*, *Z. fulvus*, *Z. crystallinus*, and *Limnæa truncatula*, all of which were abundant. The specimens are richly coloured, with dark-red mouths. So far as I can ascertain, this is the first record of this shell for Cheshire.—R. STANDEN, Manchester, September 13th, 1892.

ON SOME SHELLS FROM EASTERN BOLIVIA AND WESTERN BRAZIL.

BY C. F. ANCEY.

(Read before the Conchological Society, July 27th, 1892.)

Streptaxis comboides D'Orbigny.

Province of Matto-Grosso, Brazil; originally found in Bolivia (Chiquitos), by Alec. d'Orbigny.

Streptaxis decipiens Crosse.

Matto-Grosso, Brazil (Germain).

This species, allied to the preceding one, was doubtfully assigned by Crosse to 'Chili,' on the faith of Mr. Bryce Wright. It is more than probable that the above statement is erroneous and I even doubt the existence in Chili of any species of the genus.

Happia dalliana Anc., n. sp.

Testa depressa, minima, lucide cornea, nitida, pertenuis, aperte umbilicata (umbilicus circa $\frac{1}{4}$ diametri æquans), suprâ striis radiantibus distantibusque, præterea lineis incrementi tenuioribus impressa, infra fere lævis. Spira convexa, obtusa, parùm elevata; anfractus 5, regulariter lenteque crescentes, convexi, sutura impressa, ultimus cylindricus, circa umbilicum rotundatus; apertura subobliqua, lunato-rotundata; peristoma simplex, acutum.

Diam. maj. $3\frac{1}{4}$, *min.* 3, *alt.* $1\frac{2}{3}$ mill.

Santa Cruz de la Sierra, Eastern Bolivia (Germain).

I follow M. Bourguignat in separating from the genuine *Streptaxis* such shells as *Helix orbicula*, *H. omalomorpha* and others to which the subgeneric name of *Ammonoceras* has been applied. This being preoccupied, he rightly changed it to *Happia*.

The small species under consideration is very distinct from its congeners, and at once recalls a small *Hyalinia nitida* with radiating striæ, until the true generic affinities are perceived. I know of no species I may compare with this.

I have much pleasure in associating this with the name of Dr. Wm. H. Dall, of Washington, D.C.

Guppya anguina Anc., n. sp.

Testa turbinato-conica, minutissime perforata, tenuissima, fulva, suprà sericeo-micans, subtus nitida. Spira regulariter conoidea, elevata (sicut ac in Conulis), obtusiuscula. Anfractus $5\frac{1}{2}$, convexi, lente accrescentes, spiraliter minutissime et confertim striolati (striolis sub valida lente tantum perspicuis); sutura subappressa; ultimus fere in medio obtuse angulatus, subtus paulo laxius concentrice striatus, convexus, in centro minute impressus. Apertura obliqua, lunata. Peristoma tenue, simplex, ad columellam in trianguli parvi formam dilatatum, perforationem tegens.

Diam. maj. 4, min. $3\frac{3}{4}$, alt. vix 3 mill.

Santa Cruz de la Sierra (Germain).

This Conulus-shaped shell, I refer with some reluctance to the above genus, not having examined its soft parts, but as it is allied to *Guppya gundlachi* Pfr., and has the spiral sculpture of the latter, I suppose they are congeneric. The present species is remarkable on account of the *very* fine striæ of the upper surface, giving it a peculiar silky appearance, the lower portion being in that respect like that of our European *Conulus fulvus*.

Systrophia alcidiana Anc., n. sp.

This new species, found at Corumbá, Matto-Grosso, is very near to *S. chielostrophia* D'Orb., a Bolivian shell, but is smaller (diam. $6\frac{1}{2}$, alt. $2\frac{1}{4}$ mill.), has only fine regular crowded striæ (*not* ribs) above, less sinuous aperture, the teeth *on the lip* being very small, and possesses only six volutions at most, not $6\frac{1}{2}$ -7. The colour in the only specimen observed is white.

Bulimulus germaini Anc., n. sp.

Testa oblongo-attenuata, nitida, angustissime rimata, nitida, sub valida lente striis spiralibus incisa, subcærulescenti-alba, strigis fulvo-cærulescentibus irregulariter flexuosis aut fulguratis picta. Spira mediocriter producta, obtusiuscula. Anfractus $6\frac{1}{4}$ convexi, sutura parùm profunda discreti, ultimus attenuatus, oblongus, ad aperturam breviter subitoque ascendens. Apertura paulo obliqua, oblonga, vix lunata, superne angulata, patula, intus cum pariete et columella

liliacea, in fundo albida, strigis transmeantibus. Peristoma undique expansum, ad columellam parum contortam, fere rectam vix magis dilatatum, perforationem tegens, marginibus remotis.

Long. 28, *diam. (obliq.)* 11, *alt. apert.* 14 mill.

Matto-Grosso (Germain).

A single specimen was found ; it is somewhat like a small thin *B. felix*, but otherwise quite distinct from the New Granada shell.

Bulimulus xanthostomus D'Orb.

From Santa-Cruz de la Sierra, Bolivia. Originally described from the Yungas.

Bulimulus fusoides D'Orb.

This is a species peculiar to Bolivia. The specimens obtained from Santa Cruz de la Sierra are yellowish-ochraceous and are provided with more or less distinct and numerous obscure strips, which in some individuals are absent or very faint. The colour of aperture is characteristic. Some specimens are more slender than others. This species is *not* found in Ecuador, the specimens from that state I received under this name not belonging to it.

Bulimulus pæcilus D'Orb.

Chiquitos, Bolivia (d'Orbigny) ; Corumbá, Matto-Grosso and S.E. Bolivia (Smith, Germain).

This is a very variable and common species in the above districts.

Bulimulus pæcilus D'Orb., var. **icterica** Anc.

Testa solidula, oblongo-attenuata, obtecte perforata, nitens, læte flava cum sutura anfractuum inferiorum et area umbilicari liliaceis. Spira conica, apice minuto. Anfractus 6½, convexiusculi, sutura impressa, lineis incrementi vix perspicuis, obsoletis ; ultimus oblongus, attenuatus. Apertura obliqua, intus livido-flava ; peristoma acutum, basi patulum, ad columellam valde dilatatum, eversum, marginibus remotis.

Long. 29, *alt. (obl.)* 13, *long. apert.* 14 mill.

Province of Matto-Grosso, Brazil (Germain).

This is a striking form which I refer, with some doubt, to *B. pæcilus*. Two specimens I have seen possess just the same style of colouring, shape, and solidity.

Odontostomus wagneri Pfr., var. **paraguayana** Anc.

Differt a typico wagneri habitu magis ventrico, spira magis conica, striis costuliformibus in medianis anfractibus confertis distinctisque, basi et apice evanidis, apertura minus quadrata, dentibus tantummodo 3; uno parietali, uno columellari simplici, vix torto, pliciformi, tertioque in margine dextro illi fere opposito; anfr. 12-12½.

Long. 40, diam. 12, alt. apert. 11 mill.

Corumbá, Matto-Grosso, in the basin of the Paraguay.

Odontostomus lemoinei Anc., n. sp.

Testa sat gracilis, elongato-attenuata, tenuiuscula vel solidiuscula, anguste et oblique perforata, fulvido-grisea, subnitida. Spira elongata, regulariter usque ad summum attenuata, apice obtusiuscula. Anfractus 9½ regulariter et paulatim accrescentes, convexiusculi, sutura simplici impressaque discreti, 4 vel 5 primi subleves, sequentes costulis obliquis obsoletis præditi, inferi pallide et irregulariter vermiculati vel rugiferi, ultimus attenuatus, circa umbilicum angulatus, haud ascendens, latere dextro deplanatus et scrobiculatus, oblongus, præcedente vix major. Apertura distincte obliqua, irregulariter oblonga, extus biangulata (superne et inferne), ringens, scilicet; tuberculo parietali mediocri, lamelliformi; plica columellari vix subtorto, simplici, prominente; dente in interiore marginis dextri majore et cæteris opposito; denique callo incrassato in parte basali declivi et cum dextra angulo juncta. Peristoma prope insertionem strictum, dehinc incrassatum, album, expansum, ad basin et præsertim ad columellam dilatatum; marginis callo tenui juncti.

Long. 22, lat. 6¼, alt. apert. 6 mill.

Santa Cruz de la Sierra, Bolivia (Germain).

Var. brevior.

Magis abbreviata, relative latior, apertura major, anfractus modo 9.

Long. 18½, lat. 6¼, alt. apert. vix 6 mill.

Santa Cruz de la Sierra, Bolivia (Germain).

This form, quite a new one for Bolivia, is distinguished at a glance from similar species, as *O. achatanus* Doering, known to inhabit the Argentine Republic.

***Bulimus floccosus* Spix ?**

To this rare and beautiful species I refer, with some doubt, two examples from Santa Cruz de la Sierra, provisionally identified as *B. floccosus*. A further examination is necessary, as they may belong to a new species.

***Orthalicus pulchellus* Spix.**

Received from Corumbá, Matto-Grosso (Smith, Germain).

***Nenia orbignyi* Anc. fig 2 (end of anti.)**

This fine novelty, recently published by myself in 'The British Naturalist,' has never been figured.

It is the second species of the genus described from Bolivia, the other being *N. boliviana* Böttger, a much smaller form, only 12 mill. in length, belonging to the group of *N. adamsiana* Pfeiffer, of Chanchamayo, Andes of Peru.

N. orbignyi is somewhat allied to my *N. stylina*, from New Granada, but is larger, less slender, of different colour and shape, and is more finely sculptured, the ribs being *very* oblique. *N. crossei* Hidalgo is larger, more elongate, has more numerous volutions, and the colour and sculpture are altogether dissimilar.

This new species was discovered by Mr. P. Germain, to whom natural history is much indebted for his researches in Chili, and more recently in Paraguay, Bolivia, and Matto-Grosso.

***Cyclophorus orbignyi* Anc., n. sp.**

Testa discoideo-depressa, late et perspective umbilicata, solida, sub epidermide fulvida deciduaque griseo-albida, ad summum rubella, rudis, haud nitens. Spira parum elata, vertice prominulo, minuto. Anfractus 5 regulariter et rapide convoluti, convexi, sutura profunda; 3 primi laeves, sequentes acute lirati, liris prominentibus, regularibus (periphericis et basalibus magis elevatis), numero variabilibus, minoribus interjectis; ultimus cylindricus, prope aperturam lente des-

cendens, in umbilico ipso subito lævigatus vel pauciliratus. Umbilicus $\frac{1}{4}$ saltem latitudinis adæquans, vel paulo magis. Apertura obliqua, circularis, superne angulata. Peristoma continuum, simplex, anfractui penultimo appressum. Operculum tenue, corneum, extus concavum, cæterum arctispirale.

Diam. maj. 21, min. 16, alt. apert. (oblique) $7\frac{3}{4}$ mill.

Santa Cruz de la Sierra, Bolivia (Germain).

This looks, at first, more like an *Ostodes* from New Caledonia and other islands of the South Pacific (as *O. artensis*, *hocageanus*, or *guestieri*), than an American species. Its prominent liræ, dull colour and deciduous epidermis are its most striking characters. Although quite different, it belongs to the group of *C. cumingi*.

I give this shell the name of the great French naturalist and traveller, who first collected shells in that portion of South America, M. Alcide d'Orbigny.

***Helicina leucozonalis* Anc., n. sp.**

Testa turbinata, pallide flava, ad aperturam pallide carneo tincta, subopacula, nitens, sub valida lente lineis obliquis in directionem e dextra ad sinistram, striolas incrementi vix distinctas transgredientibus levissime impressa (lineis irregularibus, interruptis, interdum fere deficientibus). Spira conica, subacuta; anfractus 5, subplani. sutura lineari, ultimus angulo obtuso zona opace albida notato cinctus, supra convexiusculus, subtus convexus. Apertura subobliqua, semilunaris, extus subangulata; peristoma incrassatum, expansiusculum, pallide lutescens, angulo acuto externeque mucronulato cum callo columellari parvo junctum. Operculum testaceum, fulvescens.

Diam. maj. 8, min. $6\frac{1}{2}$, alt. 6, alt. apert. 4 mill.

Matto-Grosso (Germain).

In shape it somewhat resembles *H. lindeni* Pfr., *H. trossula* Morelet, and others from Mexico and Central America, but its colour, although not vivid in the three specimens before me, is quite different.

***Helicina bourguignatiana* Anc., n. sp.**

Testa peraffinis præcedenti, sed major, spira elatior, anfractus 5, color uniformiter intense luteus, peristoma vivide luteum, zona opaca ultimi anfractus magis conspicua, in penultimo suturam sequens, calum basale magis circumscriptum.

Diam. $9\frac{1}{4}$, *alt.* $8\frac{1}{2}$, *alt. apert.* $4\frac{1}{2}$ mill.

Santa Cruz de la Sierra (Germain).

I name this fine shell after my regretted friend, M. J. R. Bourguignat, the well-known author, whose recent loss for conchology will be lamented by anyone who studies European and African mollusca.

Helicina fulva D'Orb.

Originally discovered in Bolivia by d'Orbigny, but actually detected also in Matto-Grosso. The characters of this shell appear to be constant, the only variation being a more or less elevated spire. The operculum is reddish and rather thick.

Helicina lirifera Anc., n. sp.

Testa acute carinata, sublenticularis, solidula, fulvo-castanea, nitidula, concentric lirata, liris distantibus, lineas incrementi transgredientibus, infra magis approximatis. Spira late conica, acuta. Anfractus 5 applanati, sutura lineari, ultimus carina magna mediana cinctus, infra convexus. Apertura securiformis. Peristoma expansum et incrassatum, lividum, angulo haud dentifero cum callo granulato et circumscripto junctum.

Diam. maj. $12\frac{1}{4}$, *min.* $10\frac{1}{4}$, *alt. vix* 8, *alt. apert.* $4\frac{1}{2}$ mill.

Santa Cruz de la Sierra (Germain).

Distinguished from *Helicina caracolla* Moric., the nearest allied form, by the development of the liræ, much less broad peristome, more elevated spire, and many other less conspicuous features.

Helicina sulfurea Anc., n. sp.

Testa depresso turbinata, tenuis, late flava, cum lineolis concentricis albis tenuibus persæpe interruptis, interdum supra infraque carinam peripherie rubro cincta, exiliter concentric lirata, subtus spiralliter striata. Spira conica, acuta. Anfractus $4\frac{1}{4}$ plani, sutura lineari, ultimus superne declivis, subtus convexus, callo concolore, granulato, circumscripto. Apertura obliqua, securiformis, margine basali late arcuato. Peristoma expansiusculum, incrassatum, angulo submucronato cum callo junctum.

Diam. maj. $6\frac{1}{2}$, *min.* $5\frac{1}{2}$, *alt.* $4\frac{2}{3}$, *alt. apert.* $2\frac{3}{4}$ mill.

Santa Cruz de la Sierra (Germain).

This pretty *Helicina* is much like *H. angulata* Sow. and *H. carinata* D'Orb., the former a Brazilian, the latter also a Bolivian species, which, although unknown to me, does not present the same sculpturing as the present one.

Cyane sp. nov.

A single specimen was collected at Santa Cruz de la Sierra of a species which appears to belong to the above genus ; it may be distinct from *C. blandiana* H. Ad., but I do not undertake to describe it as new until I get further information about Mr. Adams's species.

Besides the above shells, the collection I had the opportunity of examining included several other *Happia* and *Bulinuli* not yet identified, two *Ancyli*, some *Planorbis*, a *Paludestrina*, a *Stenogyra*, *Helix estella* D'Orb. (Santa Cruz de la Sierra), and *H. heliaca* D'Orb. (Matto-Grosso). I intend to give some further information about them.

FIG. 1.



Odontostomus lemoinei

(See page 93).

FIG. 2.



Nenia orbigny

(See page 94).

CONTRIBUTIONS TOWARDS
A LIST OF THE MARINE MOLLUSCA
OF KILLALA BAY, IRELAND.

BY MISS AMY WARREN.

(Read before the Conchological Society, October 5th, 1892).

I HAVE been induced to prepare the following List, although only the result of shore-collecting, as the bay has never been investigated by the collector's dredge; so that my more prosaic finds will give some idea of what the locality produces, especially as it is the result of several years' research. Also, I have never been content with the mere shell-drift of the sandy shore, but have had many a day's hard work amongst the rocks—always the most interesting, and on this coast sometimes exciting, as there is often an idea of danger from the incoming rollers of the Atlantic.

Killala Bay, on the west coast of Ireland, opens to the north, and from Kilcummin Head (Mayo) to Kinnasharragh Point (Sligo) is about eight miles. The Island of Bartra ($2\frac{1}{2}$ miles long), which is all sand-hills to the seaward, lies partly across the head of the bay and forms a natural break-water, and the Enniscrone sand-hills stretch out two miles and nearly meet those of Bartra, the river Moy channel dividing them. Between these and the mainland are extensive sand-flats, and here the estuary shells are to be found. The shore under Kilcummin Head is very rocky, as is also the coast north of Enniscrone. This description of the locality will shew what to expect in the following List.

The arrangement I have followed is that of Jeffreys' 'British Conchology.'

I have to acknowledge the great kindness of Mr. J. T. Marshall, of Sevenoaks, Torquay, who has always responded most willingly to my numerous appeals for help in identification.

Anomia ehippium L. Common at low-water on stones, and *Laminaria* roots. The var. *aculeata* I have found more frequently on the roots than on stones.

Ostrea edulis L. Moyne, at the Mayo side of the Bay, is the only locality where I know the Oyster to be living.

Pecten pusio (L.). I have found this shell occasionally near Enniscrone.

P. varius (L.).

P. opercularis (L.).

P. tigrinus Müll. Only three single valves, Enniscrone.

P. maximus (L.). After storms cast up alive on the sandy shores of Bartra and Enniscrone.

Lima subauriculata (Mont.). A valve.

Mytilus edulis L. Swarming in every suitable place.

M. modiolus L.

M. barbatus L. Occasionally.

M. phaseolinus (Phil.). Rare on this coast. I have only found two alive and nesting in the *Corallina officinalis* that fringes the rock-pools at Carrahubbuck.

Modiolaria marmorata (Forb.). Rarely found in shell-sand.

M. costulata (Riss.). Rather abundant in some rock-pools at Carrahubbuck, nesting in *C. officinalis*, also in *Chondrus crispus*, though more rarely.

M. discors (L.). Same as the last, though making its nest nearer the roots of the sea-weed than *M. costulata*.

Nucula nucleus (L.). Occasionally in the dèbris amongst the rocks at Carrahubbuck.

Arca tetragona Poli. Single valves are of frequent occurrence, and one perfect specimen has been met with.

Lepton nitidum Turt.

L. clarkiae Clark. Enniscrone and Bartra.

Montacuta substriata (Mont.). Valves only in shell-sand, Enniscrone.

- M. bidentata** (Mont.). Occasionally procured in the dèbris amongst the rocks at Carrahubbuck.
- M. ferruginosa** (Mont.). Valves very common in shell-sand, and after a gale in February, 1892, I found two perfect specimens at Enniscrone.
- M. dawsoni** Jeff. A valve of this very rare species was detected by Mr. Marshall in drift from Bartra Island. Other valves were dredged in deep water off Donegal Bay in the 'Porcupine' Expedition.
- Lasæa rubra** (Mont.). Very abundant, living amongst the crowded mussels on the rocks and in the tufts of *Lichina pygmaea*.
- Kellia suborbicularis** (Mont.). In the *Saxicava* burrows in the limestone.
- Lucina borealis** (L.). A few perfect and full-grown shells on the sandy shores of Bartra and Enniscrone.
- Axinus flexuosus** (Mont.). At Bartra, frequently in shell-sand, but never alive.
- Cyamium minutum** (Fab.).
- Cardium echinatum** L. Common, cast up alive on the sandy shores after storms.
- C. exiguum** Gmel. A few good specimens at Enniscrone.
- C. fasciatum** Mont. Valves at Enniscrone.
- C. nodosum** Turt.
- C. edule** L.
- C. norvegicum** Speng. In January, 1878, an unusually severe gale displaced many sand-banks in the bay, causing them to yield up their treasures. The 'ill wind' in this case brought the treasures to land, and several very fine specimens of this handsome *Cardium* were procured at Enniscrone.
- Cyprina islandica** (L.). Rare on this coast. Single valves occasionally.
- Astarte triangularis** (Mont.). Enniscrone.

Circe minima (Mont.). At Pullaheeney, some miles north of Enniscrone.

Venus exoleta L. Frequently thrown up alive after storms.

V. lincta Pult. Same as the last.

V. fasciata (DaCost.). Very rare on this coast. I have seen only one perfect and full-grown specimen obtained at Enniscrone, and two young valves.

V. casina L. Rather rare. Only three perfect examples of this fine shell have been procured.

V. gallina L. Abundant on all our sandy shores.

Tapes virgineus (L.).

T. pullastra (Mont.). Living in muddy gravel at Moyne, and on the south side of Bartra.

T. pullastra var. **perforans** (Mont.). Abundant at Carra-hubbuck in the burrows of the *Saxicava*.

T. decussatus L. With *T. pullastra*

Lucinopsis undata (Penn.). One valve only at Pullaheeney.

Gastrana fragilis (L.). One valve on the sands, Enniscrone.

Tellina crassa (Penn.). Very rare. One specimen on the sands at Enniscrone.

T. balthica L.

T. tenuis DaCost.

T. fabula Gron.

T. pusilla Phil. Two valves on the sandy shore of Bartra, and two perfect shells taken from the stomach of haddock caught in thirty fathoms off Kilcummin Head.

Psammobia ferröensis (Chem.). Occasionally taken at Enniscrone.

P. vespertina (Chem.). Pullaheeney.

Donax vittatus (DaCost.).

Mactra solida L.

M. solida var. **elliptica** Bro. also occurs.

M. stultorum L.

Lutraria elliptica Lam. Abundant. After storms cast up alive on the sandy shores of Bartra and Enniscrone, on the sea-ward side.

Scrobicularia prismatica (Mont.). A few single valves, Enniscrone.

S. piperata (Gm.).

Ceratisolen legumen (L.). Frequently cast up alive after storms.

Solen ensis L.

S. siliqua L.

Thracia prætenuis (Pult.). A few perfect specimens were obtained at Bartra.

T. papyracea (Poli). I have seldom met with this shell. A few perfect and full-grown specimens on Bartra, and two valves of the var. *villosiuscula* in shell-sand, Enniscrone.

T. distorta (Mont.). Of frequent occurrence in the dèbris amongst the rocks at Carrahubbuck, though rarely found alive. More numerous in winter, when the storms have broken up the perforated rocks in which they harbour.

Corbula gibba Olivi.

Mya arenaria L. Abundant in the estuary.

M. binghami (Turt.). Odd valves at Carrahubbuck.

Saxicava rugosa (L.). The limestone all along the coast is excavated by this species. I have got the var. *pholadis* (L.), and var. *precisa* (Mont.), the latter at low-water attached to stones in rock-pools.

Venerupis irus (L.). Very common, occupying the deserted burrows of *Saxicava rugosa*. I have frequently taken the young in rock-pools at low-water.

Teredo megotara Han. Drift timber, several times.

Chitonidæ. Of these I have no record, as I never collected any, although seeing several when shell-hunting at low-water.

Patella vulgata L.

Helcion pellucidum (L.). Common on the *Laminariæ*.

- Tectura virginea** (Müll.). Common on stones at extreme low-water of spring-tides.
- Emarginula fissura** (L.). Occasionally at Carrahubbuck.
- E. rosea** Bell. Mr. Marshall has this species from same locality.
- Fissurella græca** (L.). Common at Carrahubbuck.
- Capulus hungaricus** (L.).
- Cyclostrema nitens** (Phil.). Rare on this coast. A few specimens in shell-sand, Enniscrone.
- Trochus magus** L. Occasionally at Enniscrone.
- T. tumidus** Mont.
- T. cinerarius** L.
- T. umbilicatus** (Mont.).
- T. duminyi** (Requien). One imperfect specimen of this very rare shell was detected by Mr. Marshall in shell-sand from Bartra.
- T. lineatus** (DaCost.).
- T. montacuti** W. Wood.
- T. zizyphinus** L.
- Phasianella pullus** (L.).
- Lacuna divaricata** (Fab.).
- L. puteolus** (Turt.). A dwarf form rather common on small sea-weeds at low-water.
- L. pallidula** (DaCost.). Occasionally on *Laminariæ* and *Fucus* at low-water.
- Littorina obtusata** (L.).
- L. obtusata** var. **fabalis** (Turt.).
- L. rudis** Maton.
- L. littorea** (L.).
- Rissoa striatula** (Mont.). Several fine specimens in the dèbris amongst the rocks at Carrahubbuck.
- R. cancellata** (DaCost.). Occasionally in the same locality as the above.
- R. reticulata** (Mont.). One only at Enniscrone.

- R. punctura* (Mont.). Of frequent occurrence at Bartra and Enniscrone.
- R. costata* (Adams). Rather common, Bartra.
- R. parva* (DaCost.). Swarming on all small sea-weeds.
- R. parva* var. *exilis* Jeff. Bartra, rare.
- R. inconspicua* Alder. Mr. Marshall has detected this shell in drift from Enniscrone.
- R. membranacea* (Adams). Occasionally at Bartra and Enniscrone.
- R. violacea* Desm. Amongst the rocks at Carrahubbuck.
- R. striata* (Adams).
- R. proxima* Alder. Rare at Enniscrone.
- R. fulgida* (Ad.).
- R. soluta* Phil.
- R. semistriata* (Mont.).
- R. cingillus* (Mont.). Of frequent occurrence.
- Hydrobia ulvæ* (Penn.). Swarming on green sea-weeds throughout the estuary.
- Barleeia rubra* (Mont.). Rare on this coast. I have only seen one.
- Jeffreysia diaphana* (Alder). Rare, Enniscrone.
- Skenea planorbis* (Fab.).
- Homalogyra atomus* (Phil.). Shell-sand, Enniscrone.
- H. rota* (For. & Han.). I wish I could say I had procured this lovely atom. But I have only gazed on it for a few moments. Some years ago I brought some small sea-weeds from Carrahubbuck, and put them in a plate of water, and had got the lens on *H. rota*, shewing well in a good light, when I was called away hurriedly, and on my return the little animal had vanished for ever.
- Cæcum glabrum* (Mont.).
- Turritella terebra* (L.).
- Scalaria turtonæ* (Turt.). Rare on this coast. I have only procured two imperfect specimens.
- S. communis* Lam. Rather frequent.

- S. clathratula* (Adams). Occasionally at Bartra and Enniscrone.
- Aclis unica* (Mont.). Mr. Marshall has this species from Bartra and Enniscrone.
- A. ascaris* (Turt.). I am also indebted to Mr. Marshall for detecting this rare shell from Enniscrone gatherings.
- Odostomia nivosa* (Mont.). Occasionally in drift from amongst the rocks at Carrahubbuck.
- O. rissoïdes* Han.
- O. pallida* (Mont.).
- O. unidentata* (Mont.). Rare. A few specimens only.
- O. turrita* Han. Occasionally.
- O. plicata* (Mont.). Common.
- O. insculpta* (Mont.).
- O. warreni* (Thompson). Very fine specimens of this rare shell from Enniscrone and Carrahubbuck.
- O. indistincta* (Mont.).
- O. interstincta* (Mont.).
- O. spiralis* (Mont.).
- The above three species are sparingly found at Carrahubbuck.
- O. excavata* (Phil.). Rare. I have only seen one.
- O. lactea* (L.). Of frequent occurrence.
- O. nitidissima* Mont. Mr. Marshall detected this rare shell in drift from Enniscrone and Bartra, six specimens in all.
- Ianthina rotundata* Leach. These ocean waifs only come ashore at rare intervals in late autumn.
- Eulima polita* (L.). A few examples. Bartra and Enniscrone.
- E. distorta* (Deshayes). Occasionally in shell-sand, Enniscrone.
- E. bilineata* Alder.
- Natica catena* (DaCost.).
- N. alderi* Forb. Vars. *lactea* and *subovalis* also occur.
- Adeorbis subcarinatus* (Mont.). Occasionally at Bartra and Enniscrone.

Lamellaria perspicua (L.). Common in shell-sand, Bartra and Enniscrone.

Velutina lævigata (Penn.). Bartra.

Aporrhais pes-pelecani (L.).

Cerithium reticulatum (DaCost.).

C. perversum (L.).

Cerithiopsis tubercularis (Mont.). Rather common in the debris amongst the rocks, Carrahubbuck. Var. *nana* also occurs.

Purpura lapillus (L.).

Buccinum undatum L.

Murex erinaceus L.

Fusus antiquus (L.).

F. gracilis (DaCost.).

Nassa reticulata (L.).

N. incrassata (Ström).

N. pygmæa (Lam.).

Defrancia linearis (Mont.). Common at Carrahubbuck.

D. leufroyi (Mich.). Mr. Marshall has this species from this locality.

D. purpurea (Mont.). A few specimens, living, at low water, Carrahubbuck.

Pleurotoma costata (Don.). Carrahubbuck.

P. rufa (Mont.). Bartra and Carrahubbuck.

Marginella lævis (Don.). Rare on this coast.

Cypræa europæa Mont.

Cylichna cylindracea (Penn.).

C. umbilicata (Mont.).

Utriculus truncatulus (Brug.).

U. obtusus (Mont.). Occasionally.

U. expansus Jeff. Mr. Marshall has this shell from Bartra.

U. hyalinus (Turt.). Very fine specimens in shell-sand from Bartra.

Actæon tornatilis (L.).

Scaphander lignarius (L.). Young shells only after a storm.

Philine scabra (Müll.). Very fine specimens, Bartra and Enniscrone.

P. scabra var. *circa* Marshall. Bartra Island. This has already been recorded in the 'Journal' for January, 1889.

P. catena (Mont.). Occasionally, Bartra and Enniscrone. Also the var. *zona* Jeff.

P. angulata Jeff. One specimen, imperfect, was detected in shell-sand from Enniscrone by Mr. Marshall.

P. punctata (Clark). Occasionally at Bartra. In 1887 I got some particularly good drift on Bartra Island, and in some I sent to Mr. Marshall he discovered the var. *cingulata* of this species, analogous to his var. *circa* of *P. scabra*.

P. nitida Jeff. Mr. Marshall detected some specimens from Enniscrone and Bartra.

P. aperta (L.). Common, Bartra and Enniscrone.

Aplysia punctata Cuv.

Melampus myosotis (Drap.). In several parts of the estuary where fresh water oozes over the muddy and grassy spots. The var. *ringens* lives with the type.

Otina otis (Turt.). Two specimens in shell-sand, Enniscrone.

Spirialis retroversus (Flem.). In shell-sand, Bartra. On one occasion, some years ago, these minute shells were washed ashore literally in millions, appearing like masses of froth.

It may be a matter of surprise to many readers to find so few *perfect* specimens recorded of those shells cast up on the beach, but their surprise would cease did they see the numbers of large powerful-billed birds—such as the great black-backed and herring gulls—always watching the receding tide ready to seize on all that may be washed up.

September 22, 1892.



ADDITIONS TO THE SOUTH DEVON LIST OF LAND AND FRESHWATER MOLLUSCA.

BY CHARLES OLDHAM.

(Read before the Conchological Society, November 4, 1892).

IN the latter half of August I spent a few days in the neighbourhood of Topsham, with my friend, Mr. L. E. Adams, and among other shells we collected were the following, which are not included in Mr. E. D. Marquand's List ('J. of C.', vol. vi, p. 136).

Arion ater.—We did not see a single typical *ater*, but found several specimens of the var. *bicolor* in grass by the road-side near Topsham.

A. subfuscus.—Two or three specimens in the same place as the last species.

A. minimus.—One at Exmouth.

A. hortensis.—Common at Topsham.

Amalia gagates.—This species and the three following ones were extremely plentiful in Mr. H. McMurdo's garden at Topsham. The typical form of *gagates* was not seen at all, the majority of those collected being referable to the var. *rava*, a few examples of the var. *plumbea* being noted.

A. sowerbyi.

Limax flavus.

Agriolimax agrestis.—Common on the road-sides and hedge-banks.

A. lævis.—A single example in a marshy spot at Exmouth, with *A. minimus*.

Hyalinia nitida.—Three specimens under a log in a meadow near Topsham.

Helix rotundata.—A single specimen of the var. *alba* with the type at Topsham.

H. caperata var. *fulva*.—A few on a bank by the road-side at Topsham.

H. virgata var. *lutescens*.—Very plentiful on the road-side between Exeter and Topsham; also at Exmouth.

Planorbis spirorbis.—In a ditch near Countess Weir.

Valvata piscinalis.—Common in the canal at Topsham.

Hydrobia jenkinsi.—In a ditch near Topsham. (Mr. Adams will give particulars of this find in another article).

Unio pictorum.—Two dead shells in the Exe at Topsham Ferry.

Pisidium amnicum var. **flavescens.**—All the shells which we took in the canal near Exeter belong to this form.

P. fontinale var. **pulchella.**—Common in ditches in Exminster marshes. The typical *fontinale* was taken in ditches by the side of the canal between Exeter and Topsham.

P. pusillum.—Common in Exminster marshes.

P. milium.—A few in Exminster marshes and the canal near Exeter.

Dreissensia polymorpha.—Small, in canal near Topsham.

During our visit we had the pleasure of inspecting collections of local shells, made by Mrs. Smith and Mr. McMurdo. They contain some beautiful series of the varieties of *H. hortensis* and *H. nemoralis*, including very fine examples of *hortensis* var. *roseozonata*. Mrs. Smith has a ventricose form of *Anodonta cygnea* from the canal at Topsham, and Mr. McMurdo an example of *H. aspersa* var. *exalbida* from a hedge-bank between Topsham and Exeter. It may be mentioned that *Hyalinia draparnaldi* occurs in Mr. McMurdo's garden.

On a patch of grass by the road-side near Topsham, we noticed three cases of union between typical *H. virgata* and the var. *lutescens*, but did not observe any other couples. At Budleigh Salterton, Mr. Adams subsequently noted a union between the vars. *lutescens* and *albicans*.

Mr. W. Denison Roebuck has kindly identified all the slugs mentioned in the foregoing list, with the exception of *A. hortensis* and *A. agrestis*, which we did not trouble to send him.

October 19th, 1892.

DESCRIPTION OF A NEW SPECIES OF *NUCULA*,
AND A LIST OF THE SPECIES BELONGING
TO THE SUB-GENUS *ACILA*.

By EDGAR A. SMITH, F.Z.S.

(Read before the Conchological Society, Nov. 4, 1892).

The very fine species about to be described has recently been obtained by the British Museum from Mr. H. Fulton. It belongs to that section of the genus, characterised by the valves being ornamented with divaricate sculpture, to which Messrs. H. and A. Adams gave the subgeneric name of *Acila*. Of this group the following recent species are known, and it also occurs fossil in the tertiary formations.

1. *Nucula (Acila) divaricata* Hinds.

Nucula divaricata Hinds. Zool. Voy. Sulphur, p. 62, pl. xviii., fig. 4.

N. divaricata Hanley in Sowerby's Thes. Conch. vol. iii., p. 155, pl. 230, fig. 151.

N. divaricata Sowerby, Conch. Icon. pl. iv., fig. 29.

N. (Acila) divaricata Chenu, Manuel, vol. ii., p. 179, fig. 899.
Hab. : China Sea at a depth of 84 fathoms.

Of this species Mr. Hanley remarks :—"Were it not that the described number of the teeth is much greater in the smaller shell, I should have believed this to be an immature *mirabilis*."

2. *Nucula (Acila) castrensis* Hinds.

Nucula castrensis Hinds. Zool. Voy. Sulphur, p. 63, pl. xviii., fig. 5.

N. castrensis Hanley, Thes. Conch., vol. iii., p. 155, pl. 230, fig. 148.

N. castrensis Sowerby, Conch. Icon., pl. iv., fig. 32.

N. lyalli Baird, in Lord's Naturalist in Vancouver, vol. ii., p. 369.

Hab. : Sitka Island, North-west America (Hinds); Esquimalt Harbour, Vancouver Island 8-10 fathoms (Baird); off Fort Rupert, Vancouver, 12 fathoms (in Brit. Mus.); Puget Sound; and Catalina Islands, California (Carpenter).

There is little doubt that the *N. lyalli* of Baird is the adult form of this species, as suggested by Carpenter in his Report on the Mollusca of Western North America.

3. *Nucula (Acila) mirabilis* Adams and Reeve.

Nucula mirabilis Adams and Reeve. Moll. Voy. Samarang, p. 75, pl. 21, fig. 8.

N. mirabilis Hanley in Sowerby's Thes. Conch., vol. iii., p. 155, pl. 229, fig. 114.

N. mirabilis Sowerby Conch. Icon., pl. i., fig. 4.

N. (Acila) mirabilis H. & A. Adams, Gen. Moll. ii., p. 545, Smith, Lamellibranchiata "Challenger," p. 230.

Hab. : Off Japan and Korea; off Kobé, 8-50 fathoms (Challenger); Nagasaki Bay (Ad. & Reeve.); Pt. Hamilton, Korea, 19 fathoms (Brit. Mus.).

4. *Nucula (Acila) insignis* Gould.

Nucula (Acila) insignis Gould. Proc. Boston Soc. Nat. Hist., 1861, vol. 8, p. 36; Otia Conchol., p. 175.

Hab. : Hakodadi (Gould); and off Cape Blunt, Japan, lat. $41^{\circ} 41' N.$, long. $141^{\circ} E.$, in 35 fathoms (Brit. Mus.).

This species has been confused with *N. mirabilis* by certain authors. It is, however, quite distinct in form. It is more regularly oval, like the fossil *N. cobboldi*, etc., and has not the pouting or rostrate extremity anteriorly, and the concentric striæ or minute lines of growth are very much finer.

5. *Nucula (Acila) fultoni* sp. nov.

Testa ovato-triangularis, valde inæquilateralis, crassa, epidermide fusco-olivacea induta, antice acuminata, rostrata, postice rotundata; margo dorsi posticus elongatus, leviter arcuatus et declivis, anticus valde descendens, ventralis regulariter arcuatus, antice prope rostrum leviter sinuatus; umbones

incurvati, ad apicem parvi, acuti, antice inclinati; valvæ validæ, liris tenuibus arcuatis in medio et prope angulum umbonalem maxime divaricatis ornatæ, lineis incrementi, hic illic conspicuis, sculptæ; area antica subconcava, sed in medio leviter prominens, liras tenuiores exhibens; pagina interna albido-margaritacea, radiatim obsolete substriata, ad marginem inferiorem tenuissime subcrenulata; cicatrices subæquales, irregulariter rotundatæ; dentes cardinis validi, acuti, anteriores circiter undecim, posteriores, quorum pauci infra apicem minimi, circa 23; fossa ligamenti mediocris, postice inclinata.

Longit. $36\frac{1}{2}$ millim., *alt.* 25, *diam.* 16.

Hab. : Bay of Bengal, off the mouth of the River Hugli, in deep water.

This species is remarkable for its large size, the very inequilateral valves, and the fine divaricate sculpture. The anterior extremity forms a decided but short beak. Near this, but a little behind the curved umbonal ridge, the valves exhibit a shallow depression or groove, which radiates from the ventral margin, where it terminates in a slight insinuation towards the umbones. The raised liræ diverge or divaricate not only at a line which runs from the apices to the lower margin bisecting the valves into about equal parts, but also at the umbonal angle. The epidermis is yellowish towards the umbones, but becomes browner and darker towards the outer margin, especially posteriorly.

In many respects this fine species resembles *N. mirabilis* (Adams and Reeve) from the Japanese Sea. It is, however, larger (being the largest living species of the genus *Nucula* yet described), has a yellowish epidermis, and is more triangular in form. The ventral outline is more broadly arcuate and less sinuated anteriorly than in *N. mirabilis*, the umbones are less terminal, the anterior or rostrate end is more produced, and the inner edges of the valves are less distinctly crenulated.



EIGG SHELLS :

NOTES ON THE LAND AND FRESHWATER MOLLUSCA OF THE
ISLAND OF EIGG.

BY THE REV. JOHN McMURTRIE, D.D.

(Read before the Conchological Society, 6th May, 1891).

*The List is authenticated by specimens, which are herewith presented to the
Museum of the Conchological Society at Leeds.*

The writer enjoyed the hospitality of the owner of the island in August, 1888, and again in July, 1890. His time was not wholly devoted to natural history, but the molluscan fauna of several likely places was examined with some care.

Eigg (pronounced Egg) is one of the Inner Hebrides, lying midway between Skye and the point of Ardnamurchan, and belonging to the conchological vice-county of Ebudes North, from which there are as yet comparatively few records of the land and freshwater mollusca. Civilly, it is in the County of Inverness, though the other islands, viz., Muck, Rum, and Canna, which together with Eigg make up the parish of Small Isles, are in Argyll. The island is six and a half miles long by four miles broad. Its geology is of great interest. It was described in 1813 by Professor Robert Jameson, in his *Mineralogical Travels through the Hebrides*, etc.; and, more recently, by Hugh Miller, in *The Cruise of the Betsy*. The prevailing rock is basalt, which over a large part of the island is disposed in columns, like those of Staffa, but on a colossal scale. The 'Scur of Eigg,' conspicuous to the voyager on those western seas, is of splendid columnar basalt 1339 feet high. The 'Singing Sand' on the north-west shore does not come within the scope of the Conchological Society, but it is a remarkable natural phenomenon, requiring further investigation. A musical

note is given out by the sand at every step, when one walks with a rubbing motion, in dry weather.

The naturalist who knows only South and East Scotland finds himself here in the presence of new forms of molluscan life. Where the land slopes gently to the sea, *Helix acuta* is almost as plentiful on the grassy shores as on the downs of Cornwall or the Isle of Wight; and *Helix itala* is as abundant as at Dover or Folkestone, though smaller, and usually with a raised spire—the variety *instabilis*. *Pupa anglica* keeps company with the familiar *P. cylindracea* on the under side of stones. In the few places where damp moss and dead leaves can accumulate *Hyalinia radiatula* is evidently not scarce, and the rare variety *viridescens-alba* may be found under stones. (*H. radiatula* is probably common in north-west Scotland. Some years ago Mr. J. H. Dixon, F.S.A., when about to publish his ‘Gairloch and Guide to Loch Maree,’ sent to the writer a quantity of shell-sand from Gairloch shore, West Ross. It contained 98 species and varieties of marine shells, and among them two shells of *H. radiatula* washed from the land).

Nead-na-Feannaig (the Crow’s or Corbie’s Nest) is the summer home of the proprietary family. The ‘burn’ which flows beside it to the sea has been taken possession of by the variety *albida* of *Ancylus fluviatilis*, to the exclusion of the type. A rill in the interior, on the way to the ‘Singing Sands,’ contained only *A. fluviatilis* var. *gibbosa*. A colony of *Helix aspersa*, here approaching its northern limit, has established itself at the foot of the minister’s glebe, on the east side of Eigg, close to the sea. (What a parish that excellent minister has to visit! sailing over wild seas, in a small open boat, to mountainous Rum and distant Canna! But he is a modest man, who does his work, and says little about it).

Limnæa peregra Müll. Lagg burn, on west side, near the sea. The stream is of considerable size.

Limnæa peregra var. **lineata** Bean. Small stream on west side, not near the sea. All the specimens shewed many

spiral ridges on the body whorl. One somewhat approaches *v. gibilmanica* in form.

Ancylus fluviatilis Müll. Manse burn. Small, often approaching var. *gibbosa*.

Ancylus fluviatilis var. *gibbosa* Bourg. Very small stream in interior of Eigg. All the specimens were of this variety.

Ancylus fluviatilis var. *albida* Jeff. Cottage burn, Nead-na-Feannaig. All the specimens were of this variety.

Arion ater L. Somewhat common. No variety found.

Arion subfuscus L. Kildonan and other places.

Arion hortensis Fér. Not uncommon.

Arion circumscriptus Johnst. Not uncommon.

Arion minimus Simr. Small, grey-lilac when alive. Kildonan, on east side of Eigg.

Agriolimax agrestis L. and var. *sylvatica*. Plentiful throughout the island.

Limax marginatus Müll. var. *nemorosa*. Among stones at Grulin, south-west Eigg. Twice the size of *L. agrestis*. Keel of pale colour along the whole back from the junction with the shield; keel bordered by two broad dark lines, which are continued along the shield; foot pale; slime watery, not sticky, colourless.

Hyalinia cellaria Müll. South end, under stones, near the sea.

Hyalinia cellaria var. *complanata* Jeff. With the type.

Hyalinia alliaria Müll. Ruined sheilin beyond Grulin, in south-west Eigg; also plentiful among moss and leaves in small open drain in lawn at Nead-na-Feannaig.

Hyalinia alliaria var. *viridula* Jeff. Of thirty-nine of this species collected by turning over the stones of the ruined sheilin beyond Grulin, eighteen were of this variety.

Hyalinia nitidula Drap. At south end, among stones near the sea.

Hyalinia pura Alder. Among stones and grass at south end, near the sea.

- Hyalinia radiatula** Alder. Four specimens among moss and leaves in small open drain in lawn at Nead-na-Feannaig; and four specimens among wet grass and stones at south end, near the sea.
- Hyalinia radiatula** var. **viridescenti-alba** Jeff. A fine specimen living with the type among wet grass and stones at south end, near the sea.
- Hyalinia crystallina** Müll. Among moss and leaves in small open drain in lawn at Nead-na-Feannaig. The specimens are all either young, or the var. *contracta* = *Z. contractus* Westerl. Also among stones and grass at south end, near the sea.
- Hyalinia fulva** Müll. Two specimens in the shallow drain at Nead-na-Feannaig.
- Helix aspersa** Müll. Behind the beach at foot of glebe; the shells stout and of a good size; some are of the *undulata* type, but no well marked variety was found.
- Helix nemoralis** L. Very few found. South end, near the sea. All the specimens small, approaching var. *minor*, banding 12345. The decidedly small specimens are noted below.
- Helix nemoralis** var. **minor** Moq. 12345. South end, near the sea.
- Helix nemoralis** var. **libellula-minor**. 12345 and 1(23)45. South end, near the sea
- Helix nemoralis** var. **libellula-minor**. 00300. East side, one specimen.
- Helix hortensis** Müll. South end, near the sea. Only a few found.
- Helix hortensis** var. **lutea** Moq. South end, near the sea. Only a few found.
- Helix arbustorum** L. The type was found on the west side only, in August, 1888. But the weather was extremely dry. Two small specimens appear to be not

fully grown, though they have the labial rib. A specimen with the upper whorls normal (except that they approach var. *pallida*), but the lower and larger part of the body whorl is membranous. The animal's power of secreting calcareous matter seems to have suddenly failed; there is, nevertheless, a perfect lip with the usual rib.

Helix arbustorum var. *flavescens* Moq. A perfect specimen, and one broken, probably by a thrush. This variety is unicolorous, somewhat solid, dull, and darker than the usual *flavescens*. South end, near the sea. About eight specimens from more than one point of the south end locality, but chiefly from the corrie opening to the sea, among debris of basalt, were pale yellowish, almost transparent, bandless, with a few white markings; thin, sometimes excessively thin, so that the shell collapsed on removing the animal, though great care was taken; they may be referred to the var. *icterina*.

Helix arbustorum var. *cincta* Taylor. South end, near the sea.

Helix arbustorum var. *fusca* Fér. Very thin, semi-transparent, brown with the usual markings and peripheral band. South end, near the sea.

Helix granulata Alder. South end, under stones near the sea; of a good size.

Helix itala L. Grassy banks near the sea, and among grass and stones on gently sloping shores; plentiful at foot of glebe. On the west shore near Lagg the variety *leucozona* prevails. The north shore was not visited, but from the description received it is probable that the species occurs there. Very thin specimens in the corrie at the south end, as noted below. The var. *grisescens* Colbeau is occasionally found with the type.

Helix itala var. *instabilis* Ziegl. The shell tends to this form throughout Eigg, and is smaller than in South Britain. Both dark and white specimens are apt to have

a raised spire and comparatively small umbilicus. Characteristic specimens of the variety are frequent.

Helix itala var. **leucozona** Moq. This variety occurred at all the localities, and is not rare. The most characteristic specimens are entirely dark brown above, only sometimes shewing a very thin white line at the suture. The periphery is always white. When alive, the shell appears black, from the dark colour of the animal. Beneath, there may be several lines, or one broad band. Intermediate forms are paler. A very thin specimen occurred in the corrie open to the sea at the south end.

Helix itala var. **alba** Charp. This variety is also common. It is of a uniform dull slightly yellowish white, but occasionally has translucent lines.

Helix itala var. **hyalozonata** Ckll. Less common than the preceding, but still not rare. It is of a pure clear white, with hyalozonate lines. Very thin specimens of the clear white hyalozonate form occurred with the thin forms of *H. arbutorum* at the south end in the corrie open to the sea.

Helix rotundata Müll. Under stones at south end, near the sea.

Helix acuta Müll. Common among herbage on glebe shore, Lagg shore, etc. The prevailing forms are two :—

- (1) Of a uniform opaque white, with the band on the lowest whorl. This is common.
- (2) A form approaching the var. *strigata*, with one dark band encircling the lowest whorl.

Among hundreds of specimens taken in Eigg, the var. *bisona* did not occur, though it has been recorded for Iona.

Helix acuta var. **strigata** Menke. Occurs with the species, and with every gradation to the normal type. Of this also there are two forms, one or other of which might be regarded as a distinct variety :—

- (1) With the band on the lowest whorl. The white ribs are broader than the intervening semi-translucent dark streaks.
- (2) Bandless. The white ribs are narrower, so that the greater part of the surface is brown and semi-translucent.

Pupa anglica Fér. Under stones near wall of small plantation above Nead-na-Feannaig ; among stones and grass at south end, near the sea ; among stones of ruined sheilin beyond Grulin. Lives with *P. cylindracea*, but is much less common. Some were whitish from having lost the epidermis.

Pupa cylindracea DaCosta. Under stones ; generally distributed. A whitish specimen among those sent seems merely to have lost its epidermis.

Pupa cylindracea var. **edentula** Moq. With the type occasionally ; but some trace of the columellar tooth is usually discernible.

Clausilia perversa Pult. South end, near the sea, under stones. Half-grown specimens, of which two are sent, resemble, as usual, *Balea perversa* L.

Cochlicopa lubrica Müll. and var. **lubricoides**. South end, near the sea, under stones.



The Examples of *Zonites cellarius* in the Montagu Collection at Exeter.—Being in Exeter last August, I could not do less than examine the Montagu Collection in the Museum. In addition to the errors mentioned by the late Dr. Jeffreys in vol. ii, p. 2, of the 'Journal of Conchology,' I noticed that certainly two shells named *Z. cellarius* are the *draparnaldi* which is found in the neighbourhood. It will be remembered that Dr. Jeffreys was himself mistaken in referring our British *draparnaldi* to *cellarius*, and figured the former as the latter in his 'Brit. Conch.'—LIONEL E. ADAMS, *Sept. 30th*, 1892. (Read before the Conchological Society, Nov. 4, 1892).

NOTES UPON *CYPRÆA CHRYSALIS* AND *CYPRÆA AMPHITHALES*.

BY JAMES COSMO MELVILL, M.A., F.L.S.

(Read before the Conchological Society, Nov. 4, 1892).

I. *Cypræa chrysalis* Kiener.

M. Kiener, in his *Iconographie*, vol. i., p. 92 (1840), drew up the following description of a Cowry, till then unknown :—

CYPRÆA CHRYSALIS 'Nobis.'

C. testâ ovata oblongâ, ad medium tumidâ, ad extremitates rostratâ, flavescente, obscure transversim fasciatâ; marginibus rubro violaceis; spirâ truncatâ; aperturâ angustissimâ dentibus minutissimis.

Coquille ovale oblongue, renflé au milieu, atténuée vers ses extrémités qui sont assez prolongées et un peu relevées vers le dos, la face inférieure est légèrement plane. La spire est tronquée et est dominée de beaucoup par l'échancrure supérieure. L'ouverture est très étroite; les échancrures sont larges et profondes. Les bords sont aplatis, ornés de denticulations transverses extrêmement fines et en grande nombre; la columelle est anguleuse. La coquille est entièrement jaunâtre; on y voit par transparence de légères traces de fascies transverses; ses échancrures sont marquées de deux petites taches d'un rouge violacé.

Long. 14 millim.

Cette jolie petite espèce, d'une forme élégante, est remarquable par le prolongement et le rétrécissement de ses extrémités. La figure 4a représente la grandeur naturelle.*

The shell is represented as being in the collection of the Museum (at Paris).

All subsequent writers seem in doubt about the personel and character of this little species. The figure and description of Kiener have been merely copied by subsequent authors, presumably owing to the disappearance of the type specimen,

* Kiener, *Iconogr. Cypræa*, Pl. 54, f. 4, 4a.

about which I can ascertain nothing. When I last visited the Museum, the Cyprææ were not arranged in very good order, but it is some years since I last visited Paris.

At all events, Reeve, Sowerby, and Roberts have, as I have said, merely copied Kiener's description and figure, and drawn conclusions, more or less erroneous as to its near affinities.

Kiener himself arranges it after *cylindrica* (Born), *quadrimaculata* (Gray), and *teres* (Gmel.), and just before *asellus* (L.), *interrupta* (Gray), and *hirundo* (L.).

Sowerby (Thes. Conch.) places it amongst the *Triviæ*, after *cicercula* (L) and *glabulus* (L), and before *annulata* (Gray), to which, in a note, he considers it allied, as a young form of some well-known species.

Mr. Raymond Roberts, in Tryon (Man. Conch. Cypræa, p. 172) describes the species as follows: 'Canary, obscurely banded, with extremities tinted deep orange, teeth very fine, no spots or other markings on the shell. Length '65 inch.' Adding—'Believed to be the young form of some other species. I do not know this shell, nor can I get other information than that derived from Kiener.'

He places it after *stolida* (L.) and *erythreensis* (Beck).

In the 'Catalogue of Cypræa' appended to the general survey of the forms and species of this genus, published in 1888,* by myself, I find this species placed after *physis* (Brocchi.) and before *isabella* (L.).

These three instances show how varied have been the opinions based only on a more or less accurate figure, copied and re-copied, opinions now, I think, all to be found very wide of the mark.

Some six or eight months ago, I received from Mr. C. W. Viner, of Bath, an undoubted example of this species, with label in Kiener's handwriting—'*C. chrysalis, nobis.*'

* Mem. & Proc. Manchester L. & P. Soc., vol. i., 4th Ser., p. 250.

In size the specimen is in accord with Kiener's plate. It is in most beautiful condition, which, I take it, the type was not, and accordingly it is seen to be delicately transversely banded with one central fascia, the ground of the shell being whitish on each side of this band, while, hardly distinguishable without a lens, are some pale round small spots, as in *C. irrorata* (Sol.), only less distinct, and it has many lateral small brown spots. The extremities are produced and somewhat beaked; at each extremity are two dark orange spots. The description, as given by Kiener, seems very accurate, excepting for the above-mentioned dorsal spots; the type specimen being probably worn and decorticated.

The examination of this very beautiful little shell, conspicuous for its numerous delicate and small teeth, elongate form, and, as already said, slightly recurved and beaked extremities, decorated with four orange spots, two at each extremity, proves it to be most nearly allied to the following, and I now wish to revise my published Catalogue as follows:—

- C. hirundo* (L.)
- C. felina* (Gmel.)
- C. fabula* (Kiener) an var. præcedentis?
- C. neglecta* (Sowb.)
- C. coffea* (Sowb.)
- C. owenii* (Sowb.)
- C. menkeana* (Desh.)
- C. fimbriata* (Gmel.)
 - Var. *microdon* (Gray)
 - Var. *unifasciata* (Mighels)
 - Var. *macula* (Adanis)
 - Var. *cholmondeleyi* (Melv.)
- C. irrorata* (Solander)
- C. chrysalis* (Kien.)
- C. quadrimaculata* (Gray)
- C. interrupta* (Gray)
- C. teres* (Gmelin)

C. tabescens (Solander)

Var. *pellucens* (Melv.)

Var. *alveolus* (Tapp.-Can.)

Var. *elaiodes* (Melv.)

* *C. rashleighana* (Melv.)

* *C. latior* (Melv.)

C. caurica (L.)

I consider it a good species, possessing some of the attributes of the var. *microdon* (Gray), of *fimbriata* (Gml.) some of *C. (Naria) irrorata* (Gray), others of *C. quadrimaculata* (Gray), but differing from all in the produced extremities.

2. *Cypræa amphithales* (Melv.).

When, in 1888 (Mem. & Proc. Manchester L. & P. Soc., vol. i., iv. ser., pp. 221, 222), I described this shell as possessing the qualifications of the type of Gray's genus *Cypræovula* combined with the type (*L. algoensis*) of the same author's *Luponia*, it was from a decorticated specimen that the conclusions were drawn. Within the last twelve months, through the kindness of Mr. Sowerby, I have been able to obtain a specimen in the very finest possible condition, which was found by Mr. S. D. Bairstow, of Port Elizabeth, and who, I understand, possesses others in as good condition. This specimen Mr. Sowerby has just illustrated, in his useful work just issued, "The Marine Shells of South Africa," pl. v., figs. 94-96, and it has been the means of confirming all the preconceived conclusions drawn from the examination of the first worn and imperfect specimens found. The shell is shining, smooth, excepting for the fine transverse liræ at the base, the back being pale shining fawn, with a darker somewhat maculate fawn-yellow blotch, extending over nearly the whole area, sides spotted fawn, as in *L. algoensis*, somewhat wrinkled. In my opinion none of the so-called genera, constituted out of *Cypræa*, are stable, and even *Trivia* ought hardly to rank as a sub-genus.

* To these species I intend to refer in a subsequent article.

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

SPECIAL NOTICE.—The Hon. Treasurer leaves Penistone at Christmas, and, from the beginning of the year 1893, his address will be: **Mr. Lionel E. Adams, B.A., 15, York Road, Northampton.** Members are particularly desired to note this, in order that there may be no delays in correspondence.

PROCEEDINGS.

203RD MEETING, FRIDAY, 19TH AUGUST, 1892.

Held (by special invitation of the President) at Burnmoor Rectory, Fence Houses, Co. Durham.

Rev. Canon Alfred Merle Norman, M.A., D.C.L., F.R.S., President, in the Chair.

Mr. Richard Howse, Curator of the Newcastle Museum, and others, were present as visitors.

New Members Elected :

Mr. Tom Brown, 237, Beverley Road, Hull.

Mr. Bartlet Span, Heywood Mount, Tenby, South Wales.

Exhibits :

The whole day was devoted to the careful and minute inspection of the President's fine and extensive collection of mollusca and marine invertebrates, but unfortunately very few members were present, owing to the great distance, and, perhaps, in some measure, to the time of year. Those who were unable to accept their President's invitation most certainly missed a great treat. Dr. Norman had taken the trouble to carry down to the village school-room about 140 drawers of shells, which he had most conveniently arranged for inspection. He made many interesting remarks upon the various specimens to which particular interest attached, and gave an extremely interesting discourse upon the genus *Buccinum* and its varieties.

His collection is specially devoted to the Terrestrial and Aquatic (both marine and freshwater) Mollusca of the Palearctic Region, which embraces Europe, the parts of Africa and Arabia which lie north of the Tropic of Cancer, Persia and Afghanistan, and all to the north of those countries, together with the entire Russian Empire, and the Islands of the Madeiran Province so far as regards their Terrestrial Fauna. His marine collection includes the Fauna of Europe, together with that of the Arctic and North Atlantic Oceans, and the seas connected with them. The North Atlantic Ocean is regarded as terminating towards the South at lat. 35° N., or at a line drawn from a little to the south of the Straits of Gibraltar on the

Eastern, to Cape Hatteras on the Western side. This boundary is adopted as perhaps the best to embrace the Arctic and Temperate regions, and at the same time to exclude the tropical animals of the Gulf of Mexico. The entire area of the Mediterranean is of course included. With a view to a greater knowledge of the distribution of the Arctic and Circumpolar Fauna, he has also procured Mollusca from the Arctic and North Temperate portion of the Pacific, especially from Behring Strait and the Arctic coasts of Asia. The collections are arranged on the plan adopted by Dr. Paul Fischer in his 'Manuel de Conchyliologie,' and in the nomenclature of genera and species Dr. Westerlund's monograph is followed, except for the Mollusca of the Madeiran Province (not included in Westerlund), where the work of Wollaston has been used.

Dr. Norman stated that although he has closely followed the nomenclature of the most recent work, that of Westerlund, he must not be supposed to acquiesce in it, and protests most strongly against the extraordinary multiplication of names due to Continental authors. In no other class of animals has 'hair-splitting' been carried out to so mischievous and absurd an extent, and it would involve the study of a lifetime, and intimate acquaintance with all the so-called species to unravel the gordian knots which have been tied. He considers that a great gain would be achieved for science if able conchologists would take up special groups, and by a careful study of the forms therein described, synonymize them and reduce the number of species within approximately correct limits.

Dr. Norman's collection of Land Shells owes its origin to the purchase of the well-known European collection of the late Dr. Tiberi, of Naples, which, while good generally, was especially rich in South European forms, and in types received from describers, and has since been largely increased, so that at the present time it contains more than twice as many forms as were in the Tiberian collection.

The marine collection has chiefly been acquired during many dredging expeditions, in company with the late Dr. Jeffreys, by Dr. Norman himself, and includes numerous specimens received from Sars, Loven, Nordenskiöld, and others. The collection of Cephalopoda is extensive, and some of the specimens are remarkably fine. They are kept in a large iron house which he has had erected in the garden, and in which he also keeps all his spirit specimens of Zoophytes, Crustacea, etc. There is a fine series of Pteropoda and Opisthobranchs (mostly in spirit). Especially noticeable were some specimens of *Akera bullata* var. *gigantea* Norm., and *Umbrella mediterranea*. *Carinaria*, *Firolida*, and *Pterotrachia* were beautifully preserved with the animals nicely shown.

There is only one cone—*Conus mediterraneus* Brug., with five varieties, in the collection. *Clathurella*, *Mangelia*, *Bela*, etc., are represented by many species from various localities. Of the rare *Halia priamus* from Cadiz there are three nice specimens, and four species of *Mitra*.

There is a nice series of *Volutamitra grønlandica*, and also of *Troschelia berniciensis*, a fine set of *Volutopsis norvegica*, and *Fumala turtoni*, the latter quite perfect, and pointed out as of special interest from having been taken

during the expeditions with Dr. Jeffreys. Of *Neptunia* (*Fusus*) *antiquus* there is a wonderful series, a couple of drawers full, from various places, showing every variation of size and form, and some very curious monstrosities, e.g., *carinatum*, *sinistrorsum*, *bioperculatum*, *cinctum*, and *scalariforme*. Dr. Norman pointed out that the scalariform variety was generally caused by an annelid forming its tube in the suture, which usually wore away, leaving the whorls of the shell detached. Some specimens were pointed out with the annelid tube running right along the suture from apex to base, and quite intact. The series of *Neptunia despecta*, *Buccinopsis dalei*, *Sipho* (*Fusus*) *propinquus*, *S. jeffreysianus*, and many other species of *Sipho* are very extensive, and the specimens in splendid condition.

Buccinum undatum, its numerous varieties and kindred species, filled many drawers. The President demonstrated very plainly and forcibly that (with the exception of *B. humphreysianum*, which is well distinguished as a good species by its peculiar operculum) the numerous so-called species, such as *B. ciliatum*, *B. glaciale*, *B. inexhaustum*, *B. fusiforme*, *B. finmarkianum*, etc., were really only forms of *B. undatum*, altered in size and form by circumstances of locality, depth of water where found, and other causes. He showed the remarkable influence of depth of water in altering the form, and very clearly demonstrated how the species ran into one another. He showed a wonderful series of curious monstrosities, besides *sinistrorsum*, *carinatum*, *imperiale*, *acuminatum*, etc., which were also surprising from their number and perfect condition. Altogether the *Buccinum* and *Fusus* groups were a treat in themselves, and alone well worth going to see!

Cypræa (4 species), *Trivia* (3), *Orula* (4) were of no special interest, beyond giving an idea of the number to be found North of the Tropic of Cancer. There is a fine set of *Aporrhais*, especially *A. pes-pelcani* var. *iongispinosum* Norman, a fine form well described by its name; *Ap. serresianus* and its var. *macandreae*; and *Ap. occidentalis* are also very nice and perfect. There are three species of *Solarium*, and one of *Bifrontia*, this last a singular shell with the whorls completely detached.

As to *Rissoa*, *Odostomia*, and kindred genera of small shells, it was hopeless to attempt to examine them, occupying as they did drawer after drawer, in hundreds of tubes. Their name is 'legion!' Of *Fanthonia* and *Scalaria* there is a beautiful series, the latter numerous in species and locality sets, and amongst them many fine specimens. A fine series of *Stylifer turtoni* in situ upon *Echinus miliaris*, and some enormous examples of *Littorina littorea* are particularly noticeable.

The *Trochidae* are very fine, some of the British forms being especially so, notably *T. magus*; so also were *Fissurella* and *Emarginula*, with a large and beautiful series of *Em. crassa* and its var. *depressa*. *Acmaea*, *Patella*, etc., were well represented by numerous 'locality' and 'variety' sets. *Chiton* was represented by twenty-six species, all very nicely preserved, including a grand series of *C. marmoreus* from Firth of Clyde. It is scarcely possible for one accustomed to the ordinary small forms of the common British *Chitons*, such as *C. marginatus* and *C. cinereus*, to credit them as British. There were also some enormous specimens of *Cryptochiton stelleri*.

Dentalium, *Siphodentalium*, and *Cadulus* were very good, and represented by numerous species and individuals.

Of *Lima* the ten species, including all the British, are very nice, but the *Pectens* are really a splendid series, with twenty-six species and no end of varieties. A fine series of *P. opercularis* and its var. *lineatus*, are especially noteworthy. There is one specimen of the var. *alba* of *P. septemradiatus*, a great rarity. *Mytilus*, *Modiola*, *Modiolaria*, and *Crenella* are very fine, with extensive locality series. The sets of *Arca*, *Nucula*, *Astarte*, etc., and *Cardium* are very beautiful, especially the last named. *Cyprina islandica* and *Isocardia cor* are very fine indeed, as also are the series of *Venus* and *Macra*. There are good series of *Pholas*, *Solen*, *Mya*, *Pholadiidea*, *Xylophaga*, and *Teredo*, the three latter mostly in situ, and some nice specimens of *Galeomma turtoni* and *Gastrochena dubia*, the latter in situ, as is also a specimen of *Clavagella*. *Tellina* always makes a good show if a number are massed together, and Dr. Norman's series is very striking. He has some fine specimens of *Gastrana fragilis*, *Solemya*, *Pandora*, *Thracia*, and *Lyonsia*.

Including the *Brachiopoda*, of which he has a good drawerful, the most noticeable being some enormous *Rhynchonella psittacea*, the Marine Collection numbers 1910 species, and also all the named varieties obtainable.

The Land and Freshwater Collection numbers 2513 species, of which 768 are *Helix*, 549 *Clausilia*, 135 *Pupa*, 133 *Buliminus*, and 103 *Hyalinia*, and contains a large number of sinistral and scalariform monstrosities. The *Limnææ* and *Planorbis* are also very numerous. Of the former Dr. Norman has a large series of Bourguignat's types of named 'varieties,' principally of *L. peregra*. The *Clausilia*, *Pupæ*, etc., are very numerous represented. There are some fine examples of the larger *Zonites*, such as *Z. algirus*, *Z. acies*, etc.

The majority of the *Helices* are small, but there is a fine series of the *Campylæa* group, of which the giant *H. pouzolzi* is a type. A reversed *H. pisana*, and a curious monstrosity, *turriculata*, were noticed, as was also a reversed *H. virgata*. The *Iberus* group is very fine, notably *H. gualteriana*. Of the *Xerophile* there are a great number, and some very pretty forms. There are several reversed *H. nemoralis*, and one scalariform specimen, all from Bundoran. The reversed *H. pomatia* are very fine, and there are some wonderful deformed scalariform specimens of it, also of *H. aspersa*, of which there is one reversed.

Of the *Vertigos*, *V. moulinsiana*, and *V. liljeborgi*, the latter were quite indistinguishable from the specimens of *Vertigo anticvertigo* mounted on the card immediately above them.

The sets of *Limnæa stagnalis* are very good, especially a series received from Hungary—Hazay's collecting. There is one reversed *L. stagnalis*, a small specimen, which Dr. Norman took himself in a very singular manner. He said that being out shooting one day, when he was a young man, he chanced to leap over a ditch, and as he leaped he looked down and saw this shell on the surface, and noticed that it was reversed too, and of course lost no time in securing it—the only one he ever saw, and never heard of another

until he saw the account of the one belonging to Mr. J. R. Hardy, in the 'Journal of Conchology.'

Of *Acme* there are 8 species—European, including some nice *Acme lineata*—British. Of *Pomatias* there are a great many species, all very much alike, and many *Bythinias*, *Paludinellas*, *Melanopsis*, and *Neritinas*, etc.

The Madeiran collection of Land and Freshwater Mollusca is kept separate from the rest; it is practically complete, and contains some very interesting forms, especially in the extinct or sub-fossil species. These were received chiefly from the Rev. R. Boog Watson.

In the display of his specimens Dr. Norman uses wooden tablets for the larger shells, though latterly he has begun to keep them loose on wool, and in card trays. The smaller species are all kept loose in tubes, arranged in wooden divisions in the drawers. This admits of a great number of species in a drawer, but they do not show very well. The tubes have to be taken up separately to examine closely, and to do this more time is required than the members had at their disposal; still there was plenty to see in the larger things, and Dr. Norman's collection will not soon be forgotten. The only regret is that there was not more members present to participate in the enjoyment of the visit.

The President entertained the members and visitors to dinner, after which the formal business was transacted before resuming the inspection of the collections. A most cordial vote of thanks to Dr. Norman for his hospitable reception was moved by Mr. William Nelson, seconded by Mr. Robert Standen, and supported by the Rev. John Hawell, M.A., and Mr. Wm. Denison Roebuck, F.L.S., and unanimously adopted. After a suitable reply by the President, the examination of his collections was resumed.—R. S. and W. D. R.

204th MEETING, WEDNESDAY, SEPTEMBER 7th, 1892.

Held at the Philosophical Hall, Leeds.

Mr. William Nelson, Hon. Curator, in the Chair.

Donations to the Library announced and thanks voted: The Naturalist, and Feuille des Jeunes Naturalistes for September; and Bulletin de la Soc. d'Etudes Scientifiques, 1re and 2e semestres d. 14e année, 1891; from the respective Editors and Society.

Donations to the Collections announced and thanks voted:

From Mr. J. Burman Rosevear: *Helix (Fruticicola) similis* Fér., *Bulinus exilis* Gm., *B. (Borus) oblongus* Müll., *Stenogyra octona* Chem., *Streptaxis deformis* Fér., *Orthalicus zebra* Müll., *Voluta musica* L., and *Zellina (Strigilla) rombergii*, all from Barbados.

From Rev. Geo. Gordon, LL.D.: *Limnea peregrina*, from Balnageith, near Forres, Elginshire, Aug. 1892.

New Member Elected:

Mr. R. J. Lechmere Guppy, 26, Queen's Terrace, Port-of-Spain, Trinidad.

Candidates Proposed for Membership :

Mr. James Eddowes Cooper (proposed by Messrs. J. B. Rosevear and H. Wallis Kew, F.E.S.); and Mr. Tom Petch, B.A. (by Messrs. F. W. Fierke and W. Denison Roebuck, F.L.S.).

Exhibits :

On behalf of Messrs. Lionel E. Adams, B.A., and Charles Oldham, were shown a large number of shells collected on a walking tour through Devonshire, Dorsetshire, and Somersetshire, in the neighbourhood of Exeter, Topsham, Portland, Axminster, Exmouth, Minehead, Watchet, etc., including a well-marked and typical example of the var. *maculata* of *Limax marginatus* (*arborum*) from Axminster, hitherto only known as Irish; several fine adults of var. *bicolor* of *Arion ater* from Topsham; *Limax flavus*, *Amalia gagates* vars. *rava* and *plumbea*, *A. sowerbyi* and a very black juvenile example, from Exeter; *Arion minimus*, from Axminster; *A. subfuscus*, *Amalia gagates* v. *rava*, and *A. sowerbyi* from Topsham; typical *A. gagates* and *A. sowerbyi*, from Portland; *Arion minimus* and *Limax levis*, from Exmouth; as well as a large number of shells, which were afterwards presented to the Society's collection, as being new county-authentication records,

On behalf of Mr. Charles Oldham were shown *Limax flavus* and the rare (as British) typical form of *Amalia gagates*, from Sale, Cheshire.

On behalf of Mr. F. Taylor, of Oldham, were shown several slugs, including the type and vars. *brunnea*, *alba*, and *bicolor* (very fine example), of *Arion ater*, *A. hortensis*, *Amalia sowerbyi*, *Limax flavus*, and var. *aldrovandi* of *L. maximus*. The last-named example is probably the first characteristic one of var. *aldrovandi* on record for Britain.

205th MEETING, WEDNESDAY, OCTOBER 5th, 1892.

Mr. John W. Taylor, F.L.S., Vice-president, in the chair.

Donations to the Library announced and thanks voted. From the respective Editors: Naturalist and Feuille des Jeunes Naturalistes for Oct., and L'Exchange Revue Linneenne for August, 1892.

From the respective Societies: Journal of Hamilton Association (Canada), No. 8, 1891-2; Proceedings of Linnean Society of New South Wales, vol. 6, parts 2, 3, and 4, 1891-2; and Abstract Proceedings, 27th July, 1892.

From the respective Authors: R. Bullen Newton on the American Palæozoic Gastropod, *Trematonotus* (Hall emend. P. Fischer), and its Identification in Britain, with Description of a New Species (Extr. Geol. Mag., August, 1892); Edgar A. Smith, Description of a New Species of *Spondylus* and a new *Helix*; and G. F. Tregelles, the Marine Testaceous Mollusca of Cornwall, 1885 (with MS. annotations by the author).

Donations to Collections announced and thanks voted:

From Mr. Lionel E. Adams, B.A.: *Limnea glabra* and *Sphærium lacustre* from Thurgoland, Yorkshire.

From Messrs. L. E. Adams and Charles Oldham: *Clausilia perversa* and *Hyalinia cellaria* from Axminster, S. Devon; *H. alliaria* from Exmouth; *H. glabra* var., and *Helix lapicida* from Portland; *Sphærium lacustre*, *Limnæa peregra*, *L. truncatula*, *Planorbis spirorbis*, *Succinea putris*, and *Pisidium fontinale* from Minehead, S. Somerset; *Hyalinia glabra*, *H. cellaria*, *H. alliaria* and var. *viridula*, *H. pura* v. *margaritacea*, *H. crystallina* and v. *contracta*, *H. nitidula*, *Helix fusca*, *H. rotundata* v. *alba*, *H. caperata* and v. *fulva*, *H. aspersa*, *H. hispida* v. *hispidosa*, *Pupa cylindracea*, *Vertigo edentula*, *Clausilia perversa*, *C. laminata*, and *Cochlicopa lubrica*, all collected between Minehead and the western border of Somerset; *C. lubrica*, *Helix hispida* v. *hispidosa*, *H. virgata*, *H. nemoralis* v. *carnea* (12345), *H. hortensis* v. *carnea* 00000 *roseolabiata*, *H. pulchella* v. *costata*, *Pupa cylindracea*, *Ancylus fluviatilis*, *Pisidium cinereum*, *P. nitidum*, *P. roseum*, *Cyclostoma*, and *Limnæa truncatula* v. *minor*, all collected between Minehead and Watchet; and *Hyalinia nitida*, *Sphærium corneum*, *Pisidium roseum*, *P. pusillum*, *P. fontinale*, and *P. pulchellum* from Topham, S. Devon.

From Rev. W. L. W. Eyre, M.A.: *Sphærium lacustre* var. aff. *brochonaniana*, from a pond at Thorny Down, Swarraton, Hants N.

From Rev. Herbert Milnes: *Helix arbustorum* and vars. *cincta* and *flavescent*, from Winster, Derbyshire.

From Mr. J. Burman Rosevear: *Lucina* (*Codakia*) *tigerina* L., from Barbados.

From Mr. Charles Oldham: *Helix aspersa* v. *undulata*, from Southwell, Notts.

From Mrs. Janet Carphin: Numerous Scottish shells, mostly additions to the county records, including *Sphærium corneum* v. *nucleus*, *Physa fontinalis*, *Planorbis spirorbis*, *Pl. contortus*, *Pl. albus*, *Pl. umbilicatus*, *Pl. nautilus*, *Pl. nitidus*, *Succinea putris*, *Valvata piscinalis*, *Limnæa palustris*, *L. peregra* var. *lacustris*, *Pisidium milium* (*roseum*), *P. pusillum*, and *P. fontinale*, all from Lochmaben, Dumfriesshire; *Helix pulchella*, from near Peebles; *H. granulata* (*sericea*), *H. arbustorum*, and *Unio margaritifera*, from Dunkeld, Perthshire; *Ancylus lacustris* and *Planorbis nautilus* v. *crista*, from Bridge of Allan, South Perthshire; *Cochlicopa lubrica*, from Strathyre, Perthshire; *Helix caperata*, from Innerleithen, Peeblesshire; and *Limnæa peregra* v. *maritima*, but not characteristic, from Largo, Fifeshire.

New Members Elected:

Mr. Jas. Eddowes Cooper, 93, Southwood Lane, Highgate, London, N.
Mr. Tom Petch, B.A., Hedon, near Hull.

Candidate Proposed for Membership:

Mr. E. W. S. Swanton (proposed by Messrs. J. W. Taylor, F.L.S., and W. Denison Roebuck, F.L.S.).

Papers Read:

A paper by Miss Amy Warren, entitled 'Contributions towards a List of the Marine Mollusca of Killala Bay, Ireland' [printed in 'J. of C.', Oct. 1892, pp. 98-107].

Two notes by Mr. Robert Standen, one on '*Pupa ringens* in Cheshire,' and one on 'Extraordinary Finds of *Vertigo pygmæa* at Clitheroe, Lancashire, and Beezley, Yorkshire' [both printed at p. 89 of 'J. of C.' for July, 1892].

A note by Mr. W. Denison Roebuck, F.L.S., on '*Arion ater* v. *bicolor* in Derbyshire and the Isle of Man' [printed at p. 77 of 'J. of C.' July, 1892].

Exhibits :

On behalf of Mr. Charles Oldham were shown several slugs, including *Limax flavus* and *L. maximus* v. *cellaria* from Farnsfield, Notts. ; *L. flavus* from Oxtou, near Southwell ; and *Amalia gagates* v. *rava*, from Ashton-on-Mersey, Cheshire.

The Recorder exhibited Scottish shells sent by Mr. William Evans, F.R.S.E., including *Cochlicopa lubrica*, *Hyalinia fulva*, *H. alliaria*, and *H. radiatula*, from Dalwhinnie, Easternness.

On behalf of the Rev. Herbert Milnes were shown a Jersey example of *Helix aspersa* ; several *H. arbustorum* v. *flavescens*, some showing at the mouth beginnings of bands, from Winster, Derbyshire ; and very large examples of *Bythinia tentaculata* from the Trent at Nottingham.

On behalf of Miss Amy Warren were shown *Amalia gagates* v. *rava*, and *Arion minimus*, from the beach at Carrahubbuck, county Sligo.

Mr. W. Denison Roebuck exhibited various shells collected at Castle Howard, Byland, Wass Bank, and Withernsea, including *Helix fusca* from near the Derwent at Castle Howard Railway Station.

Election of Member :

By an unfortunate inadvertence, the election of

Mr. James Bassett Dixon, Ashton House, Ashton-on-Ribble ; and 15, Bushell Place, Preston, which took place on the 12th December, 1891, has never been notified in the Journal.—W. D. R.

MANCHESTER BRANCH MEETING,

At Owens College, October 13th, 1892.

Mr. W. E. Hoyle, M.A., in the chair.

New Member Elected :

Mr. Thos. Sparkes, Moss-side, Manchester.

Arrangements for Annual Meeting :

Arrangements for the reception of the Parent Society at the Annual Meeting, to be held in the Manchester Museum, Owens College, on Nov. 4th, occupied the chief attention of the meeting, and Messrs. W. E. Hoyle, J. Ray Hardy, and R. Standen were appointed as a sub-committee of management to make all necessary preparations for that event.

New Cabinet :

The Secretary (Mr. Standen) announced that the Cabinet placed at the service of the Branch by the Owens College authorities was now ready for the reception of specimens contributed by members, and some liberal donations were promised.

Exhibits :

By Mr. W. E. Hoyle : A collection of shells from the Victoria Nyanza, collected by Emin Pasha, including *Planorbis stanleyi* Smith, *Melania tuberculata* Müll., *Paludina unicolor* Oliv., *Cleopatra emini* Smith, *Corbicula radiata* Parr., *Unio bakeri* A. Ads., and a form of (probably) *Limicolaria cailliaudi*.

By Mr. F. Gordon Pearcey : A richly-coloured and interesting sub-scalariform specimen of *Trochus sisyphius*, dredged in eight fathoms, at Campbellton Loch, Scotland ; and *Acme lineata*, from Merionethshire.

By Mr. Ed. Collier : An interesting series of *Helix nemoralis*, from Mappleton, Dovedale, Derbyshire.

By Mr. W. Moss : *Pisidium pusillum* and *Limnæa truncatula* var. *minor*, from Isle of Man ; *Helicina articulata*, *H. sublaevigata*, *Stenogyra artensis*, *S. juncea*, *Helix sinistrorsa*, *Hydracæna granum*, from Lifu, Loyalty Islands.

By Mr. Thos. Rogers : *Helix nemoralis* and *H. hortensis*, from Denmark ; some large and very thin-shelled *H. arbustorum*, from Ben Laoigh, Scotland, and a series of land shells from Tenby.—R. STANDEN, Hon. Sec.

206TH (ANNUAL) MEETING, TUESDAY, NOVEMBER 4th, 1892.

Held in the Botanical Laboratory, Owens College, Manchester, at 6 p.m.

The Chair was occupied by the President, Rev. Canon Alfred Merle Norman, M.A., D.C.L., F.R.S., etc.

The attendance included about fifty members and friends, the list of signatures bearing the names of Messrs. W. Denison Roebuck, F.L.S., Hon. Secretary ; Lionel E. Adams, B.A., Hon. Treasurer ; Edgar R. Waite, F.L.S., Hon. Librarian ; J. Cosmo Melvill, M.A., and John W. Taylor, F.L.S., Vice-Presidents ; R. D. Darbishire, B.A., F.G.S., and W. E. Hoyle, M.A., Members of Council ; Rev. H. G. Barnacle, M.A., Thos. F. Burrows, Loftus St. G. Byne, R. Cairns, H. Champ, E. Collier, A. T. Daniel, Hugh Fulton, Conrad Gerland, D.Sc., W. H. Heathcote, Thos. Hey, Alfred Leicester, P. B. Mason, J.P., F.L.S., Rev. Herbert Milnes, Wm. Moss, F.C.A., Charles Oldham, Thos. Rogers, R. Standen, and J. M. Williams, besides a few visitors.

The minutes of the 205th meeting were taken as read and confirmed.

Library Purchases announced : Mrs. Merrifield's Natural History of Brighton.

Donations to Library announced and thanks voted: From the respective Editors: *Feuille des Jeunes Naturalistes* and the *Naturalist*, for November; *L'Echange Revue Linneenne*, for September; and *British Naturalist*, January—October.

From the Society: Abstract Proceedings, Linnean Society of New South Wales, August 31, 1892.

From the Trustees: Records of the Australian Museum, vol. ii., Nos. 2 and 3, August, 1892.

From the respective Authors: Canon Norman on 'The Genera Cyclostoma and Pomatias, and on a misapplied Rule of Zoological Nomenclature,' (May, 1891); Canon Norman on 'The Molluscan Genera Cyclostoma and Pomatias,' etc. (August, 1891); W. Denison Roebuck, 'Additions to the Authenticated Comital Census of the Land and Freshwater Mollusca of Scotland,' Articles 6—10 (Oct. 1892); Mrs. M. Burton Williamson and W. H. Dall, 'An Annotated List of the Shells of San Pedro Bay and Vicinity' (1892); C. Hedley, 'On the Structure and Affinities of *Panda atomata* Gray' (1892); C. Hedley, 'Observations on the Charopidae,' part i. (1892).

Donations to Collections announced and thanks voted: From Rev. W. C. Hey, M.A.: *Linnaea auricularia* var. *acuta*, R. Derwent near West Ayton, Yorkshire.

Donation to Cabinet Fund announced and thanks voted: From Mr. Hubert Elgar, 5s.

Appointment of Scrutineers.

Messrs. Loftus St. George Byne and Charles Oldham were appointed to examine the Voting Papers.

New Member Elected:

Mr. E. W. S. Swanton, Bratton St. Maur, Wincanton, Somersetshire.

Candidates Proposed for Membership.

Mrs. H. G. Brierley (proposed by Messrs. G. K. Gude and H. Wallis Kew, F.E.S.); Mrs. Janet Carphin (by Messrs. W. Denison Roebuck, F.L.S., and Thomas Scott, F.L.S.); and Mrs. Louisa J. Smith (by Messrs. Lionel E. Adams, B.A., and Charles Oldham).

Decease of Member Announced:

The death of Mr. A. J. R. Sclater, of Teignmouth, was announced by the Secretary.

Members Struck Off the Roll:

It was announced that the Council had given instructions to omit the names of Mr. Daniel Pidgeon, F.G.S. (formerly of London), Mr. S. T. Martin (formerly of Manchester), and Mr. Thomas P. Smyth, J.P. (formerly of Penzance), from the next List of Members, in consequence of their present addresses being unknown, letters addressed to them being returned through the Dead Letter Office.

Honorary Life Member Elected :

On the recommendation of the Council, it was unanimously resolved that the vacancy on the list of honorary life members caused by the death of M. J. R. Bourguignat be filled up by the election of Mr. William Nelson, of Leeds, one of the four founders and original members of the Society.

Annual Reports :

The Annual Report of the Council was read on behalf of the Secretary by Mr. Edgar R. Waite, F.L.S., Hon. Librarian.

The Balance Sheet and Treasurer's Report were read by Mr. Lionel E. Adams, B.A., Hon. Treasurer.

The Annual Report of the Manchester Branch was read by Mr. Robert Standen, Hon. Secretary of the Branch.

On the motion of Mr. R. D. Darbishire, B.A., seconded by Mr. Robert Cairns, the adoption of the Reports was unanimously resolved upon.

Election of Officers :

The Scrutineers reported that they had examined the voting papers sent in, 46 in number, all of which they had found valid ; and that the following members had been duly elected to constitute the Council and fill the offices stated for the year 1893 :—

PRESIDENT—PHILIP BROOKE MASON, J.P., F.L.S., Burton-on-Trent.

VICE-PRESIDENTS—W. E. HOYLE, M.A., F.R.S.E., Manchester ; Rev.

A. M. NORMAN, D.C.L., F.R.S., Burnmoor, Co. Durham ; JOHN

WILLIAM TAYLOR, F.L.S., Leeds ; Rev. R. BOOG WATSON, B.A.,

LL.D., F.R.S.E., Cardross, Dumbartonshire.

HON. TREASURER—LIONEL E. ADAMS, B.A., Northampton.

HON. SECRETARY AND RECORDER—WM. DENISON ROEBUCK, F.L.S., Leeds.

HON. CURATOR—WILLIAM NELSON, Leeds.

HON. LIBRARIAN—EDGAR R. WAITE, F.L.S., Leeds.

COUNCIL—R. D. DARBISHIRE, B.A., F.G.S., Manchester ; JOHN R. B. MASEFIELD, M.A., Cheadle, Staffordshire ; JAMES COSMO MELVILL, M.A., F.L.S., Manchester ; JOHN H. PONSONBY, F.Z.S., London ; R. F. SCHARFF, B.Sc., Ph.D., M.R.I.A., Dublin ; EDGAR A. SMITH, F.Z.S., London.

Date and Place of Next Annual Meeting :

On behalf of Mr. John R. B. Masefield, M.A., it was moved, and resolved unanimously, that the next Annual Meeting be held at Burton-on-Trent ; and it was afterwards resolved that the date of the Meeting be fixed for Saturday, the 16th of September, 1893.

Vote of Thanks :

On the motion of the new President, Mr. Philip B. Mason, F.L.S., seconded by Mr. John W. Taylor, F.L.S., it was unanimously resolved that the best thanks of the Society be presented to the officials of the Owens

College, and to the Manchester Branch, for their kind and hospitable reception of the Society.

The Presidential Address

Was then delivered by the retiring President, Rev. Canon Alfred Merle Norman, M.A., D.C.L., F.R.S., who gave an extempore discourse on 'The Collecting of Mollusca, and their Preservation.' At the conclusion of the address, a vote of thanks to the President was unanimously adopted, on the motion of Mr. R. D. Darbishire, B.A., F.G.S., seconded by Mr. J. Cosmo Melvill, M.A., F.L.S.

Papers Read :

By Mr. Lionel E. Adams, B.A. : A note on 'The Examples of *Zonites edliarius* in the Montagu Collection at Exeter' [printed in 'J. of C.' for Oct. 1892, p. 119].

By Mr. Edgar A. Smith, F.Z.S. : 'Description of a new species of *Nucula*, and a list of the species belonging to the sub-genus *Acila*' [printed in 'J. of C.' for Oct. 1892, pp. 110—112].

By Mr. Cosmo Melvill, M.A., F.L.S. : 'Notes upon *Cypræa chrysalis* (Kiener), and upon *C. amphithales*' [printed in 'J. of C.' for Oct. 1892, pp. 120—123].

By Mr. Chas. Oldham : 'Additions to the South Devon List of Land and Freshwater Mollusca' [printed in 'J. of C.' for Oct. 1892, pp. 108—109].

By Mr. F. W. Wotton : 'The Life-history of *Arion ater* and its power of Self-fertilization' [printed in 'J. of C.' for Jan. 1893, p. 158].

Exhibits :

By the President (The Rev. Canon A. M. Norman, M.A., D.C.L., F.R.S.) : (A) *Buccinum*—Various species and forms of this genus ; (B) *Limnæa stagnalis*—Various forms, including types of many varieties from their describers ; (C) *Helix lowei*—Supposed recent specimen, with fossil specimens for comparison ; (D) Pearl growth in *Margaritana margaritifera*, *Mytilus edulis*, and *Cardium edule* ; (E) Monstrosities—(a) *Sinistral* specimens of *Buccinum undatum*, *Neptunea antiqua*, *Purpura lapillus*, *Helix pomatia*, *H. aspersa*, *H. nemoralis*, *H. virgata*, *H. pisana*, *H. vermicularis*, *Zonites carniolicus*, *Limnæa stagnalis*, and *L. peregra* ; (b) *Dextral* specimens of *Clausilia parvula* Studer and *Cl. stramineicollis* Parr ; (c) *Bioperculated* specimens of *Buccinum undatum* and *Neptunea antiqua* ; (d) Various monstrosities of *Buccinum undatum* and *Neptunea antiqua*, *Helix pomatia*, *H. aspersa*, *H. hortensis*, *H. pisana*, *H. vermicularis*, etc.

By the Society : Selection from the Brazier Collection of Australian Mollusca.

By the Manchester Branch : A selection of *Unio tumidus* and *U. pictorum* from the cabinet of the branch, illustrating gradations of form between the two species.

By Mr. John W. Taylor, F.L.S. : Types and varieties of British land shells, chiefly from their describers.

By Mr. R. D. Darbishire (President of the Manchester Branch): (a), A collection of shells from the Falkland Islands; (b) *Zonites algirus* and *Rumina decollata*; (c) Some European Helices—*H. pouzolzi*, *H. codringtoni*, *H. lucorum*, *H. alonensis*, *H. cincta*, *H. atrolabiata*, *H. punctata*, *H. æthiops*, and *H. gaultheriana*; (d) *Helix pomatia*, *H. aspersa*, *H. nemoralis*, and *H. hortensis*; (e) *H. pisana*, reversed and scalariform monstrosities.

By Mr. Edward Collier ('Columbus Centenary Exhibit'): (a) Types of land shells from the West Indies; (b) South American land shells, showing relative proportions of Helicidæ to Bulimidæ.

By Mr. Frank Collier: Helices from Dovedale, Derbyshire, August, 1892, including *H. nemoralis* vars. *albolabiata* (with accompanying darts), *roseolabiata*, *bimarginata*, *rubella*, and *castanea*, showing remarkable richness of colour.

By Mr. J. B. Dixon: *Vertigo pusilla*, *Cyclostoma degans*, *Clausilia dubia*, and *Balea*, etc., from Silverdale, Lancashire; *Gibbus lyonetianus*, and South American *Bulimi*.

By Mr. John Hardy, jun.: *Buccinum undatum* and varieties from Grimsby, including sinistral specimens.

By Mr. T. H. Burrows: A beautiful scalariform *Limnæa stagnalis* from Belland, near Nottingham.

By Mr. Lionel E. Adams, B.A.: Collecting apparatus of an improved type for travellers' use.

By Mr. G. W. Chaster: Decollated *Clausiliæ*.

By Mr. W. H. Johnson: *Isocardia cor* and *Cardium norvegicum* of large size, dredged off Fleetwood.

By Mr. J. Ray Hardy: Boring Mollusca—*Lithodomus*, *Gastrochaena*, *Cumingia*, *Saxicava*, *Petricola*, and *Jouanettia*, from shells of *Spondylus lamarckii* from Mazatlan.

By Mr. W. H. Heathcote: (a) Selection of British and foreign marine shells, including *Pholadidea papyracea* and its burrow; *Mya binghami*; *Ovula patula* with its animal; *Natica islandica*, *N. sordida*, and *N. montacuti*; *Fusus jeffreysianus* and *F. propinquus*; a selection of shells from Southport and Port Erin; and *Isocardia cor* from Fleetwood and Bristol Channel; (b) *Helix regina*; (c) Collecting apparatus; (d) Large *Anodonta cygnea* from Cloughton, Lancashire, 8 to 9 inches long (the largest known British specimen) and some curious abnormalities.

By Mr. Thos. Hey: Mollusca of Derbyshire, including a series of *Anodonta cygnea* graduating in form to *A. anatina*; *Unio pictorum* graduating to *U. tumidus*; *Helix nemoralis* and *H. hortensis* with very dark coalesced banding, almost black, and many other peculiarly-marked forms; a series of *Helix virgata*, *H. caperata*, *H. rufescens*, and *H. ericetorum*, four species which are rather scarce in Derbyshire.

By Mr. Hy. Hyde: Species of *Cypræa*.

By Mr. J. Cosmo Melvill: (a) *Harpa costata* (Linn.) (= *L. imperialis* Lam.). The type, figured in Reeve, 'Conch. Icon.,' from the collection of

the Rev. F. J. Stainforth, presented by him to Miss Augusta Hardcastle, and bequeathed by her to the present possessor. It is remarkable for its close-set overlapping ribs, forty in number, the usual total being eight or ten less. Five other specimens are shown for comparison; the largest of these five is the Dalmahoy specimen, which possesses thirty-four ribs. A small highly-coloured five-ribbed variety is also noteworthy; (*b*) *Latirus præstantior* (Melv.), a new species, described 1892, allied to *L. castaneus* (Reeve), also exhibited for comparison, at present unique, from Sir David Barclay's collection, probably Mauritian; (*c*) *Cypræa chrysalis* (Kiener), rediscovery, by the exhibited specimen, of this lost species; (*d*) *Cypræa amphithales* (Melv.), with its allies *C. capensis* (Gray) and *C. algoensis* (Gray), this species uniting the two forms *Cypræovula* and *Luponia* of Gray in its own person, all from the Cape—the original type, a decorticated specimen, also shown; (*e*) *Trichotropis bicarinata* (Brod. and Sowb.), Arctic seas; (*f*) *Gladius* (Klein) [= *Rosellaria* (Lam.)], eight species of the genus, including *G. martinii* (Marrat) from Cebu, only one other specimen known, also *G. powisii* (Petit); (*g*) *Turbo splendidulus* (Sowb.), received from Mr. R. D. Darbishire, hab. Mozambique, it is operculated, only two other specimens are known; (*h*) *Eutropia* (Humphrey) [= *Phasianella* (Lam.)], most of the described species, including varieties of *E. tritonis* (Chem.), *E. bulimoides*, *E. sanguinea*, and others; (*i*) *Vanikoro* (Quoy and Gaimard) [= *Narica* (Recluz)], fourteen species of this rather anomalous genus; (*k*) *Cylindrella* (Br.) [= *Urocoptus* (Desh.)], about 110 species, including six species of *Eucalodium* and two of *Megaspira*; (*l*) *Acroptychia metableta* (Crosse), a Cyclostomid with regular scalariform varices, its allies *A. æquivoca*, *A. lei* (Br.), and *A. foliacea*; (*m*) *Helicina viridis* (Lam.), an emerald-green species, with scarlet blotches, two specimens; (*n*) *Cardium deshayesi* (Payr.), from the Mediterranean Sea; (*o*) *Corbis* (*Gafrarium*) *sowerbyi* (Reeve), a rare shell, with transverse frilled varices, Eastern Pacific.

By Mr. W. Moss: (*a*) Shells from Trinidad and Lifu, Loyalty Islands; (*b*) Radulæ under the microscope; (*c*) Micro-photographs of Radulæ.

By Mr. Thos. Rogers: Shells collected during ship's detentions at ports from Zanzibar to Cape Town, by J. Gibbons, M.B.

By Mr. R. Standen: (*a*) *Limnæa stagnalis*, varieties, and numerous 'locality' series; (*b*) British *Sphærium* and *Dreissena*; (*c*) *Pholas crispata*, illustrating a new method of preserving the siphons.

By Mr. R. Cairns: *Helix nemoralis* from Hawick; a number of varieties of *H. itala* and *Bulinus acutus* from Peel, Isle of Man; *Hyalinia draparnaldi* and *H. aspersa* monst. *sinistrorsum* and monst. *scalariforme*, also from Isle of Man.

By Mr. Lewis Shackelford: South Australian *Tellinæ*.

By Mr. F. W. Gamble: *Hancockia eudactylæ* Gosse, from Plymouth, with enlarged drawing of the animal.

By the Manchester Museum: (*a*) *Magilus antiquus* in coral; (*b*) Achatinellidæ from the Sandwich Islands; (*c*) Shells from the Albert Nyanza, collected by Emin Pasha.

ANNUAL REPORT.

The Council, in presenting their Report for the year 1892, have to congratulate the members upon a year of steady and continued progress.

The membership, which stood at 215 at the date of the last annual meeting, is now 220, composed of 9 honorary life members, 13 ordinary members resident abroad, and 198 ordinary members on the home list.

Nineteen new ordinary members have been elected during the year. Seven ordinary members have resigned, and six whose addresses are no longer known or ascertainable, have been struck off the list, while the only loss which the Society has sustained by death has been that of one of the honorary life members, M. J. R. Bourguignat, one of the foremost conchologists of his school in France.

Ten meetings have been held since the last annual meeting, one at the residence of our President, by his special and most generous invitation, and the remaining nine at Leeds. The members, unfortunately but few in number, who availed themselves of the President's kind invitation to inspect his wonderfully complete and extensive collections at Burnmoor Rectory, will have it long in remembrance.

A very large number of interesting exhibits have been made at all the meetings.

The following Papers have been read :—

J. R. B. Tomlin—'Notes on the Marine Mollusca of the North Wales Coast, etc.'

E. A. Smith—'Descriptions of a New Spondylus and a New Helix.'

Rev. J. W. Horsley—'List of Mollusca found at Meiringen, Switzerland.'

R. Starden—'Observations on the Reproduction of the Dart during an attempt to breed from a sinistral *H. aspersa*.'

T. D. A. Cockerell—'New varieties of American Mollusca.'

G. W. Chaster—'Shell-Hunting in Merionethshire.'

C. F. Ancey—'On some Shells from Eastern Bolivia and Western Brazil.'

Gerald W. Adams—'Land and Freshwater Mollusca at Karachi.'

Lionel E. Adams—'List of Derbyshire Slugs.'

Miss Amy Warren—'Contributions towards a List of the Marine Mollusca of Killala Bay, Ireland.'

In addition to which, a large number of short notes, written by Messrs. Robert Standen, W. Denison Roebuck, J. B. Beckett, C. F. Ancey, T. D. A. Cockerell, Lionel E. Adams, Thomas Rogers, E. R. Sykes, E. D. Marquand, and Miss F. M. Hele, have been read. All these papers and notes have been printed in the 'Journal of Conchology.'

Three of the four numbers of the 'Journal of Conchology' have been issued to the members during the year, and the fourth, the issue of which is delayed by the preparation of illustrations, is now in the printer's hands and will be ready before very long. The arrangements for issuing the Journal have been as of late years, in accordance with the agreement entered into

with the Editor, and your Council recommend the continuance of these arrangements, which have worked to mutual satisfaction.

The Society's Collections, which are deposited at the Museum of the Leeds Philosophical and Literary Society, and are in part displayed for public inspection, have been materially augmented during the year. Among the donations, special attention may be called to an interesting series of East Indian shells, given by Miss J. E. Linter; to a large number of Devonshire and Somersetshire shells as new records for those counties, presented by Messrs. L. E. Adams and C. Oldham; and to a considerable number of new records presented for Scottish counties, from Mrs. Carphin. Donations of smaller extent, but none the less appreciated, are from Messrs. J. B. Rosevear, J. W. Dixon, Rev. H. Milnes, Rev. W. L. W. Eyre, L. E. Adams, W. Denison Roebuck, Rev. Dr. Geo. Gordon, Rev. W. C. Hey, J. D. Butterell, R. S. Ferguson, R. Barnes, E. Self, Miss Mary Kimber, A. H. Pawson, P. H. Grimshaw, W. Evans, H. Richardson, Arthur Mayfield, C. Ashford, and E. D. Marquand.

The Society is indebted to Messrs. H. Champ, W. Bendall, J. R. B. Masfield, H. Coates, W. Whitwell, D. Robertson, Lieut.-Col. G. S. Parry, Mr. Hubert Elgar, Mrs. Evans, and Mrs. J. Hodgson, for donations in money towards the fund for providing Cabinets and glass-topped boxes for the proper display of the specimens; in several instances these being *annual* donations.

The Curator has devoted considerable attention to mounting and labelling the accessions to the collections under his care, but finds that his available leisure time is hardly sufficient to cope with the work. Your council, therefore, recommend that Sub-Curators be appointed to co-operate with Mr. Nelson in the work, and would be glad if members—no matter whether resident in Leeds or not—would volunteer their services in this way.

The Curator would be glad to receive donations, firstly—towards the Type Series, in scientific order, which he is forming, and, secondly—towards the series of County and Geographical Collections. In respect of these last, your Council are sorry that the request made in the last annual report—that Lancashire members would contribute a series from their county—has met with little or no response.

The Library has increased during the year by numerous donations and a few purchases. The principal additions have been a set of the conchological publications of the British Museum, from the trustees, and a large number of reprints of Papers on Indian Mollusca, by various authors, presented by Mr. G. K. Gude, while other donations have been received from Messrs. R. B. Newton, E. A. Smith, G. F. Tregelles, Rev. R. B. Watson, M. Cossmann, T. D. A. Cockerell, W. Crouch, R. Bergh, A. L. Reade, W. Denison Roebuck, J. W. Taylor, J. Brazier, Rev. Carleton Greene, A. C. Gatto, R. E. C. Stearns, and F. W. Wotton.

The Hon. Librarian (Mr. Edgar R. Waite) has further to report that moderate use is made of the Library by members of the Society, and your Council would remind members that the Library is available, with but little restriction, for the use of members resident in any part of the British Isles.

During the year the Sub-Committee appointed for the purpose of preparing a new edition of the Conchological Society's Standard List of the British Land and Freshwater Mollusca, has completed its labours, and the catalogue prepared by them has been duly approved and printed in the Journal, and has also been reprinted for sale.

The reports of the Treasurer and of the Manchester Branch are appended.

Treasurer's Report.

In presenting my Report for the current year I regret to have again to draw attention to the amount of arrears, which is £29. Moreover the balance of £3 8s. 1d. is merely nominal, as only two numbers of the 'Journal' have as yet been paid for, and the payment for them will considerably augment next year's expenses. It is therefore to be earnestly hoped that the Members in arrear will see their way to lessen the deficit.

—LIONEL E. ADAMS, Hon. Treasurer, Penistone, *November 4th, 1892.*

BALANCE SHEET.

GENERAL FUND.

Receipts.	£	s.	d.	Payments.	£	s.	d.
Balance from 1891 ...	2	10	3	Cost of Journals (viz. :			
Subscriptions received in				Oct. 1891, Jan. 1892,			
1892... ..	45	10	0	July 1892)... ..	26	8	8
Sale of Journals, Reprints				Secretary's Expenses ...	8	4	2
and Lists... ..	0	19	0	Treasurer's Expenses ...	2	14	2
Interest allowed by Bank	0	1	1	Stationery and Furniture	6	4	6
				Books bought... ..	1	0	3
				Rent of Room at Leeds			
				for 1891	0	10	6
				Gratuity to Porter at Leeds	0	10	0
				Balance in Hand	3	8	1
	<u>£49</u>	<u>0</u>	<u>4</u>		<u>£49</u>	<u>0</u>	<u>4</u>

CABINET FUND.

Receipts.	£	s.	d.	Payments.	£	s.	d.
Balance from 1891 ...	2	12	8½	Tubes, etc., bought ...	0	7	5
Donations received in '92	2	15	0	Balance in Hand... ..	5	0	3½
	<u>£5</u>	<u>7</u>	<u>8½</u>		<u>£5</u>	<u>7</u>	<u>8½</u>

Audited and found correct by
WM. MOSS, F.C.A.
ROBERT CAIRNS.

LIONEL E. ADAMS,
Hon. Treasurer.

REPORT OF THE MANCHESTER BRANCH

TO NOVEMBER 4TH, 1892.

MR. PRESIDENT AND GENTLEMEN,

I am pleased to report that the Manchester Branch continues to increase in strength, and in the zeal and scientific attainments of its members.

Seven new Members have joined during the year, and we now number thirty-nine.

The meetings held during the year have been well attended, the exhibitions and discussions numerous and interesting, and the attention given to the study of British and Foreign Marine Mollusca is increasing.

Many interesting notes and records have been made during the year, either during the excursions of the Branch or the holidays of individual Members. The most important have been the first recorded instances of the occurrence of *Pupa ringens* in Cheshire and the Isle of Man; *Isocardia* cor off Fleetwood; and *Trochus granulatus* from Morecambe Bay.

The Owens College authorities have very handsomely placed a large and useful Cabinet at the service of the Branch. A large number of species of British Marine, Land, and Freshwater Mollusca have already been placed in the Cabinet by members who have liberally contributed to the series. It is intended to make this a standard collection: as complete as possible in locality series and varieties of the British Molluscan Fauna generally, for authentic record, and for reference and comparison. Further contributions to that end will be esteemed, especially for the Manchester district, and the coasts of Lancashire and Cheshire. It is proposed to institute a careful selection of characteristic specimens, with accurate nomenclature, and scientific arrangement; and, later on, to publish a catalogue of the collection for the use of the members.

The following Notes and Papers have been contributed during the year:—

By Mr. Ed. Collier: 'On the genus *Placostylus* from New Caledonia.'

By Mr. R. D. Darbishire, B.A., F.G.S.: 'On the genus *Thelidomus* of Swainson'; and 'On the occurrence of *Achatina acicula* in a Grecian lachrymatory from Corfu.'

By Mr. W. E. Hoyle, M.A.: 'The Life History of two rare species of Cephalopoda, *Ocyropsis tuberculata* and *Chiroteuthis veranyi*.'

By Mr. Robert Standen: List of species collected at Marple, Cheshire, during the Whit-week excursion of the Branch (including *Pupa ringens*, of which the habitat was described); and 'Notes on the Norman and Alder Collections.'

By Mr. Wm. Moss, F.C.A.: 'A list of the Slugs of the Isle of Man.'

By Mr. F. G. Pearcey: 'Description of the Habitat of *Chiton marmoreus* in the Firth of Clyde.'—ROBERT STANDEN, Hon. Secretary Manchester Branch, November 4th, 1892.

LIST OF MEMBERS.

(With year of election; O = founder, or original member; L = Life Member,
who has compounded for his subscription).

HONORARY MEMBERS

(Limited to ten in number).

1889. Bergh, Prof. Dr. Rud., Vestre Hospital, Stormgade, 19, 2, Copenhagen.
 1889. Binney, Wm. G., 222, E. Union St., Burlington, New Jersey, U.S.A.
 1889. Cossmann, Maurice, Ingénieur-chef des services techniques du chemin
 de fer du Nord, 95, Rue de Maubeuge, Paris.
 1889. Crosse, Hippolyte, Rue Tronchet, 25, Paris.
 1878. Kobelt, Dr. Wilhelm, Schwannheim, Frankfort-am-Main.
 1886. Martens, Dr. Eduard von, C.M.Z.S., Paulstrasse, Berlin, N. W.
 O Nelson, William, Gandy Row, Crossgates, Leeds.
 1889. Philippi, Dr. R. A., Director del Museo Nacional, Santiago, Chile.
 1889. Sars, Prof. G. O., Universitat, Christiania, Norway.
 1889. Simroth, Dr. Heinrich, Gohlis, Leipzig.

ORDINARY MEMBERS.

1891. Adams, Gerald Wheatley, M.R.C.S., L.R.C.P., Clifton, Ashbourne,
 Derbyshire.
 1885. Adams, Lionel Ernest, B.A., 15, York Road, Northampton.
 1889. Agius, Paul, B.A., 106, Strada Reale, Valetta, Malta.
 1892. Alletsee, Albert Gregory, 40, Milward Crescent, Hastings, Sussex.
 1891. Ancey, César Felix, Membre de la Société Malacologique de France,
 Member of Colorado Biological Association, Membre de la
 'Societas Entomologica' de Zurich, etc., Administrateur-
 Adjoint, Boghari, Algeria.
 1888. Bailey, Rev. George, F.R.M.S., The Manse, Finchingfield, Essex.
 1886. Baillie, William, Brora, near Golspie, Sutherlandshire.
 1889. Baker, Arthur Edwin, 77, Conduit Street, Leicester.
 1886. Barnacle, Rev. H. Glanville, M.A., F.R.A.S., The Vicarage,
 Holmes Chapel, Crewe, R.S.O.
 1887. Beaulah, John, Ravensthorpe, Brigg, Lincolnshire.
 1891. Beckett, James Benjamin, 9, Orford Hill, Norwich.
 1888. Bell, Alfred, 78, Wells Street, Oxford Street, London.
 1886. Bendall, Wilfrid, 28, Gloucester Place, Portman Square, London, W.
 1884. Bostock, Edwin D., The Radfords, Stone, Staffordshire.
 1879. Brazier, John, F.L.S., C.M.Z.S., Curaçoa House, 82, Windmill
 Street, Sydney, N.S.W.
 1893. Brierley, Mrs. H. G., Glen View, Gledholt, Huddersfield.
 1887. Brown, Alfred, 7, Bowmont Terrace, Glasgow.
 1892. Brown, Tom, 237, Beverley Road, Hull.
 1890. Burkill, Isaac Henry, Caius College, Cambridge.
 1888. Burrows, Thomas F., 4, Wellington Road, Newark-on-Trent.
 1879. Butterell, J. Darker, 4, Willow Grove, Westwood, Beverley.

1888. Byne, Loftus St. George, 5, Sea View Terrace, Teignmouth, Devon.
1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne.
1893. Carphin, Mrs. Janet, 1, Lauriston Park, Edinburgh.
1878. Cash, William, F.G.S., F.R.M.S., 38, Elmfield Terrace, Halifax.
1892. Champ, Henry, c/o S. & J. Watts & Co., Portland St., Manchester.
1887. Chaytor, R. C., Scrafton Lodge, Middleham, Bedale, Yorkshire.
1889. Christy, Robert Miller, F.L.S., Pryors, Broomfield, near Chelmsford, Essex.
1886. Coates, Henry, F.R.P.S., Pitcullen House, Perth.
1885. Cockerell, T. D. A., F.Z.S., F.E.S., Institute of Jamaica, Kingston, Jamaica, W.I.
1880. Collier, Edwd., 1, Heather Bank, Moss Lane East, Oxford Road, Manchester.
1887. Cooke, Rev. Alfred Hands, M.A., F.Z.S., King's College, Cambridge.
1892. Cooper, James Eddowes, 93, Southwood Lane, Highgate, London, N.
1886. Coulson, Frank, 6, Montague Terrace, Kelvinside, Glasgow.
1888. Cox, Chas. Stanley Bell, B.A., M.R.C.S., San Remo, Chelston, Torquay.
1886. Craven, Alfred F., F.G.S., F.Z.S., 65, St. George's Road, Warwick Square, London, S.W.
1892. Craven, Henry Ernest, Matlock Bridge, Derbyshire.
1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
1889. Crawshaw, Rev. Charles, Wesley Villa, Saltburn-by-the-Sea.
1886. Crick, Walter D., 7, Alfred Street, Northampton.
1888. Crouch, Walter, F.Z.S., Grafton House, Wellesley Road, Wanstead, Essex.
1879. Cundall, J. W., 21, Elgin Park, Redland, Bristol.
1886. DaCosta, Solomon J., 2, Craven Hill, London.
1888. Dale, Henry F., A.A., B.Sc., F.R.G.S., F.R.M.S., F.Z.S., F.E.S., etc., Post Office, Estabrook, Park Co., Colorado, U.S.A.
1888. Dale, (Mrs.) Violet, P.O., Estabrook, Park Co., Colorado, U.S.A.
1888. Dale, (Miss) A. M., Hatherley, Bampfylde Rd., Torquay, Devonshire.
1892. Daniel, Arthur Trevelyan, M.A., Richmond Terr., Stoke-on-Trent.
1886. Darbishire, Robert D., B.A., F.G.S., Victoria Park, Manchester.
1878. Davis, James William, F.S.A., F.L.S., F.G.S., Chevinedge, Halifax.
1889. Dawson, Oswald, Caledonian House, Leeds.
1891. Dawson, Robert Southworth, 4, Richmond Rd., Bradford, Yorkshire.
1888. Dewick, Rev. Edward S., M.A., 26, Oxford Square, London, W.
1892. Dixon, James Bassett, 15, Bushell Place, Preston.
1886. Dodd, B. Sturges, 67, Beech Avenue, New Basford, Nottingham.
1886. Duncan, W., 31, Mill Lane, Montrose, Forfarshire, N.B.
1892. Eccles, John Christopher, 20, Winckley Square, Preston.
1891. Elgar, Hubert, 18a, Tunbridge Road, Maidstone, Kent.
1884. Elliot, Edward J., High Street, Stroud, Gloucestershire.
1888. Evans, (Mrs.) A., sen., Brimscombe Court, Thrupp, near Stroud.

1886. Eyre, Rev. W. L. W., M.A., Swarraton Rectory, Alresford, Hants.
 1889. Falloon, (Mrs.) Beatrice J., Long Ashton Vicarage, Clifton, Bristol.
 1891. Farrer, Captain Wm. James, Orange Court House, Virginia, U.S.A.
 1890. Fierke, Frederick Wm., 52, Francis Street West, Hull.
 1887. Fitzgerald, Francis R., F.S.Sc., 26, Great Percy Street, Pentonville, London, W.C.
 1884. Fitzgerald, H. Purefoy, North Hall, Preston Candover, Hants.
 1886. Fitzgerald, (Mrs.) J., 10, West Terrace, Folkestone, Kent.
 1888. Fortune, Riley, F.Z.S., Ravensgill, Franklin Mount, Harrogate.
 1892. Fulton, Hugh, 216, King's Road, Chelsea, London, S.W.
 1886. Gain, Wm. Albert, Tuxford, Newark, Notts.
 1887. Galizia, Joseph Sylvester, M.D., 59, Guildford Street, Russell Square, London, W.C.
 1889. Gaskell, Roger, M.A., 5, The Grove, Highgate, London, N.
 1887. Gatto, Alfred Caruana, B.A., 59, Strada Levante, Valetta, Malta.
 1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., etc., Accrington, Lancashire.
 1886. Godlee, Theo., Whips Cross, Walthamstow, Essex.
 1887. Gordon, Rev. George, LL.D., Braebirnie, Elgin, N.B.
 1886. Greene, Rev. Carleton, M.A., Great Barford Vicarage, St. Neots.
 1890. Grocock, Leonard Oakley, 21, Beckenham Road, Penge, London.
 1890. Gude, G. K., 5, Giesbach Road, Upper Holloway, London, N.
 1892. Guppy, R. J. Lechmere, 26, Queen's Terrace, Port of Spain, Trinidad.
 1886. Gwatkin, Rev. Prof. H. M., M.A., 8, Scrope Terrace, Cambridge.
 1891. Hadow, Gerald Elliot, South Cerney Vicarage, Cirencester.
 1886. Hagger, John, F.L.S., Repton School, Burton-on-Trent.
 1888. Halstead, John J., 19, Millholme Terrace, Carlisle.
 1887. Hanley, Sylvanus, F.L.S., Hanley Road, Hornsey Road, London, N.
 1887. Hargreaves, J. A., 40, Ramskill Road, Scarborough, Yorkshire.
 1889. Hartley, Alfred, 8, Cavendish Road, Idle, near Bradford, Yorkshire.
 1887. Harvard, T. Mawson, 16, Radford Road, Hither Green, Lewisham, London, S.E.
 1891. Hawell, Rev. John, M.A., Vicarage, Ingleby Greenhow, Middlesbrough.
 1891. Hawes, Alfred, Penistone, Yorkshire.
 1887. Heathcote, Wm. Henry, 54, Frenchwood Street, Preston.
 1889. Hedworth, Thos. H., 1, Railway Terr., Dunston, Gateshead-on-Tyne.
 1888. Heitland, (Mrs.) M., The Priory, Shrewsbury.
 1892. Henshall, Joseph, Ivy Cottage, Barton-on-Irwell, near Manchester.
 1878. Hepburn, Frederick, B.A., Sutton, Surrey.
 1887. Hey, Thomas, Bloomfield Street, Derby.
 1887. Hey, Rev. Wm. Croser, M.A., Derwent House, West Ayton, Seamer, York.
 1886. Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1886. Hockin, (Miss) S., Phillack Rectory, Hayle, Cornwall.
 1888. Hodgson, (Mrs.) Julia, Chalgrave Vicarage, Leighton Buzzard, Beds.
 1886. Holmes, W. J. O., F.L.S., Strumpshaw Hall, Norwich.

- 1891. Horsley, Rev. J. W., Holy Trinity Vicarage, Woolwich.
- 1890. Howard, James, 21, Burnt-Ash Road, Lee, London, S.E.
- 1884. Howell, G. O., 3, Ripon Villas, Ripon Rd., Plumstead, London, E.C.
- 1892. Howorth, Sir Henry Hoyle, K.C.I.E., M.P., F.S.A., etc.,
Bentcliffe House, Eccles, Manchester.
- 1886. Hoyle, W. E., M.A., M.R.C.S., F.R.S.E., Keeper of the Man-
chester Museum, Owens College, Manchester.
- 1883. Hudson, Baker, Public Library, Middlesbrough-on-Tees.
- 1886. James, John H., A.R.I.Cornwall, 3, Truro Veian Terrace, Truro,
Cornwall.
- 1886. Jenkins, A. J., 6, Douglas Terrace, Douglas Street, Deptford,
London, S.E.
- 1891. Jenner, James Herbert Augustus, F.E.S., 4, East Street, Lewes.
- 1888. Jones, (Miss) Laura C., 5, Alexandra Road, Clifton, Bristol.
- 1888. Jones, Wm. Jas., jun., 27, Mayton Street, Holloway, London, N.
- 1889. Jordan, H. K., F.G.S., The Knoll, Clytha Park, Newport,
Monmouthshire.
- 1887. Kew, H. Wallis, F.E.S., 5, Giesbach Road, Upper Holloway,
London, N.
- 1889. Knight, G. A. Frank, M.A., Rosenlaui, Bearsden, Glasgow.
- 1891. Lamb, Henry, Lime Villas, Bower Street, Maidstone, Kent.
- 1879. Laver, Henry, M.R.C.S., F.L.S., Trinity Street, Colchester, Essex.
- 1892. Layard, Edgar Leopold, C.M.G., F.Z.S., etc., Otterbourne, Bud-
leigh Salterton, South Devon.
- 1878. Leicester, Alfd., 1, Priory Gardens, Weld Rd., Birkdale, Southport.
- 1886. Lightwood, James T., Hope House, Lytham, Lancashire.
- 1889. Linter, (Miss) J. E., Arragon Close, Twickenham, Middlesex.
- 1886. Lowe, Edward Joseph, D.L., J.P., F.R.S., F.L.S., F.G.S., F.R.A.S.,
etc., Shirenewton Hall, Chepstow, Monmouthshire.
- 1887. Luther, S. M., Garrettsville, Ohio, U.S.A.
- 1891. Lyons, Lady, Kilbrough, Swansea, Glamorganshire.
- 1889. MacAndrews, James J., Lukesland, Ivy Bridge, Devonshire.
- 1885. McKean, Kenneth, F.L.S., Lloyds, London, E.C.
- 1886. McMurtrie, Rev. John, M.A., D.D., 5, Inverleith Place, Edinburgh.
- 1884. Madison, James, 167, Bradford Street, Birmingham.
- 1885. Marquand, Ernest D., Fermain House, Guernsey.
- 1887. Marshall, J. T., Sevenoaks, Torquay, Devonshire.
- 1887. Masefield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
- 1888. Mason, Philip Brooke, J.P., M.R.C.S., F.L.S., F.Z.S., Horninglow
Street, Burton-on-Trent.
- 1889. Mayfield, Arthur, 88, Stafford Street, Norwich.
- 1887. Mellors, George W., Locksley House, Sherwood Rise, Nottingham.
- 1880. Melvill, James Cosmo, M.A., F.L.S., Kersal Cottage, Prestwich,
Manchester.
- 1891. Middleton, Robert, Gledhow, near Leeds.
- 1888. Milne, J. Grafton, Albert Square, Bowdon, Cheshire.
- 1879. Milnes, Rev. Herbert, M.A., Winster Vicarage, near Derby.

1891. Mitchell, James, 240, Darnley Street, Pollokshields, Glasgow.
 1886. Morgan, J. Bickerton, 30, Severn Street, Welshpool.
 1891. Morris, Cecil Herbert, Lewes, Sussex.
 1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
 1887. Newstead, A. H. L., B.A. Cantab., Roseacre, Epping.
 1891. Newton, Richard Bullen, F.G.S., 76, Chesilton Road, Munster Park, London, W.
 1890. Nicholson, John, Chapeltown, Pudsey, Yorkshire.
 1891. Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., F.L.S., etc., Burnmoor Rectory, Fence Houses, Durham.
 1887. North, S. W., M.R.C.S., F.G.S., Micklegate, York.
 1887. Oldham, Charles, Ashlands, Ashton-on-Mersey, Cheshire.
 1889. Paling, Albert, B.A., B.Sc., Middlesex Hospital, London.
 1882. Parke, George H., F.L.S., F.G.S., St. John's, Wakefield.
 1887. Parry, Lieut.-Col. G. S., 18, Hyde Gardens, Eastbourne, Sussex.
 1888. Peal, Charles Nathaniel, F.L.S., F.R.M.S., Fernhurst, Mattock Lane, Ealing, London, W.
 1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock, Oxfordshire.
 1892. Petch, Tom, B.A., Hedon, near Hull.
 1890. Pickard-Cambridge, C. Owen, Bloxworth, Wareham, Dorsetshire.
 1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
 1885. Quilter, Henry E., 34, Sparkenhoe Street, Leicester.
 1888. Radcliffe, John, 111, Oxford Street, Ashton-under-Lyne.
 1886. Ramage, John, 20, Hill Street, Dundee, Forfarshire, N.B.
 1887. Reader, Thomas W., F.G.S., 171, Hemingford Road, Barnsbury, London, N.
 1885. Redding, J. Roland, 31, Belvedere Road, Dublin.
 1887. Renton, Robert, Fans Road, Greenlaw, Berwickshire, N.B.
 1888. Rhodes, Frederick, 13, Moorside Terrace, Moorside Road, Eccleshill, Bradford, Yorkshire.
 1888. Robertson, David, F.L.S., F.G.S., Fernbank, Millport, Great Cumbrae, N.B.
 1892. Robinson, Charles, 29, Stretford Road, Manchester.
 O Roebuck, Wm. Denison, F.L.S., Sunny Bank, Leeds.
 1886. Rogers, Thomas, 27, Oldham Road, Manchester.
 1892. Rosevear, Jolin Burman, Roselea, 51, Crouch Hill, London, N.
 1893. Rosevear, Samuel Blackman, 122, West Street, Fareham, Hants.
 1877. Scharff, Robert F., Ph.D., B.Sc., M.R.I.A., Curator of the Natural History Museum, Dublin; 22, Leeson Park, Dublin.
 1886. Scott, Thomas, F.L.S., 14, Lorne Street, Leith, N.B.
 1893. Shackelford, Lewis John, Ripley College, Ripley, Derbyshire.
 1887. Shaw, Alexander, 439, St. Vincent Street, Glasgow.
 1892. Shillito, John G., 20, Elmore Road, Sheffield.
 1886. Shrubsole, George Wm., Town Hall Square, Chester.
 1889. Siggs, F. L., B.A., Middlesex Hospital, London.
 1884. Skilton, (Mrs.) Mary, 21, London Road, Brentford, Middlesex.

1886. Smart, Rev. R. W. J., M.A., Parkham Rectory, Bideford, N. Devon.
 1886. Smith, Edgar A., F.Z.S., Nat. History Museum, South Kensington, London, W.
 1892. Smith, Mrs. Louisa J., Monmouth House, Monmouth Street, Topsham, Exeter.
 1886. Smout, Charles L., 101, East Street Buildings, Baker Street, London, W.
 1886. *L* Somerville, Alexander, B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow.
 1887. Somerville, Rev. James E., M.A., B.D., 11, Southpark Terrace, Hillhead, Glasgow.
 1886. Sowerby, Geo. Brettingham, F.L.S., 121, Fulham Rd., London, S.W.
 1892. Span, Bartlet, Heywood Mount, Tenby, South Wales.
 1886. Standen, Robert, 40, Palmerston Street, Moss Side, Manchester.
 1888. Stanley, Frederick, Rokeby, Edgar Road, Margate, Kent.
 1886. Steel, James, (Glass Stainer), 104, Renfrew Street, Glasgow.
 1888. Stirrup, Mark, F.G.S., High Thorn, Bowdon, near Manchester.
 1888. Storrs, Rev. George Godwyn, B.A., Laurel Cottage, Florence Road, Southsea.
 1885. Storey, J. A., B.A., St. Joseph's, High School, Cardiff.
 1890. Stubbs, Arthur Goodwin, Sherwood Rise, Nottingham.
 1892. Swanton, E. W. S., Bratton St. Maur, Wincanton, Somersetshire.
 1888. Sykes, Ernest Ruthven, B.A., 9, Belvedere, Weymouth, Dorsetshire.
 1886. Taylor, (Miss) Helen L., Woodside, Rowditch, Derby.
 1887. Taylor, J. M., Free Museum, Paisley, Renfrewshire, N.B.
 O Taylor, John W., F.L.S., Spring Bank, Horsforth, Leeds.
 1886. Tomlin, J. R. Brockton, B.A., 59, Liverpool Road, Chester.
 1886. Turner, Rev. William, 5, St. Andrew's Square, Edinburgh.
 1880. Tye, G. Sherriff, 10, Richmond Road, Handsworth, Birmingham.
 1886. Viner, C. W., M.A., Ph.D., 9, Seymour Street, Bath.
 1891. Waite, Edgar R., F.L.S., Assistant Curator, Australian Museum, Sydney, N.S.W.
 1890. Warren, (Miss) Amy, Moyview, Ballina, Co. Mayo, Ireland.
 1891. Walker, Bryant, 18, Moffat Building, Detroit, Michigan. U.S.A.
 1885. Waters, A. H., B.A., Willoughby House, Mill Road, Cambridge.
 1886. Watson, Rev. Robert Boog, B.A., F.R.S.E., F.L.S., Free Church Manse, Cardross, Dumbartonshire.
 1888. Whatmore, Charles A., Much Marcle, Herefordshire.
 1886. Whitwell, Wm., F.L.S., 4, Thurleigh Road, Balham, London, S.W.
 1889. Williams, John M., 4, Exchange Alley, Liverpool.
 1891. Williamson, Rev. Charles Arthur, M.A., c/o Rev. Canon Bromley, Benwell Vicarage, Newcastle-on-Tyne.
 1890. Wood, Albert, Wyndley, Sutton Coldfield, Warwickshire.
 1886. *L* Woodward, Bernard B., F.G.S., F.R.M.S., 131, The Grove, Ealing, London, W.
 1886. Wotton, F. W., 11, Moira Terrace, Cardiff, Glamorganshire.

A THEORY AS TO THE POSSIBLE INTRODUCTION
OF *HYDROBIA** (*PALUDESTRINA*) *JENKINSI*.

By LIONEL E. ADAMS, B.A., NORTHAMPTON.

(Read before the Conchological Society, Dec. 7th, 1892).

Last August (1892) when on a long-to-be-looked-back-upon conchological walking tour with my friend, Mr. C. Oldham, this very local species rewarded our search at Countess Weir, half-way between Exeter and Topsham. We were accompanied by Mr. MacMurdo, of Topsham, whose collection of local species, by the way, is well worth a visit.

Having last year (Sept. 1891) found *P. jenkinsi* at Sandwich in a very similar habitat to that at Topsham, and having visited the Plumstead locality, which is also very similar, under the guidance of the Rev. J. W. Horsley, it occurred to me that this similarity might throw some light upon the manner of its introduction into Britain—provided, of course, that it is not really indigenous.

It is a little curious, that before we actually found the shell, I had remarked to Mr. Oldham how greatly Topsham reminded me of the old-world, sleepy and decayed Cinq Port; and upon reflection and enquiry the similarity increased.

Both towns were of considerable importance as trading ports until, roughly speaking, two hundred years ago, when from different causes both subsided in favour of their respective sisters, Dover and Exeter.

Mr. MacMurdo informs me that in the reign of Henry VIII. two men-of-war, which afterwards fought against the Armada, were built on the spot where *P. jenkinsi* now flourishes. They must have been vessels of very small draft to have navigated the Exe at all. It appears that in these times vessels used to

* On the generic name see Mr. E. A. Smith's presidential address, Q. J. C., vol. vi., p. 336.

go regularly to Countess Weir. Between 1840 and 1855 there was a regular trade between St. Petersburg and Finland and Topsham, in hemp, tar, and timber, which trade ceased with Topsham thirteen years ago, the timber being now unshipped at Exmouth and sent to Exeter by rail or canal.

Sandwich, too, in former times, imported timber from Cronstadt (whence timber from Finland may also have been shipped), and also from several Swedish and Prussian ports, and this trade was continued till quite recently, when the improved harbours of Dover and Ramsgate killed it.

Along the south bank of the Thames timber has been unloaded from, doubtless, many parts of the world, but certainly from Russia and Finland.

The only ports, then, trading mutually with two of our three English ports are Cronstadt (St. Petersburg) and some Finnish ports along the Gulf of Bothnia. Though Topsham imported timber also from America, I do not find that Sandwich ever did so; Sandwich, again, imported timber from Sweden, Norway, and Prussia, but I can find no record of the same for Topsham.

Now the fact of the same foreign locality exporting timber to three different British ports (the only known habitats of the species in question), and that same foreign locality being the only one, as far as my information goes, trading mutually with two of the three seems a curious coincidence, and, though by no means amounting to anything like proof, forms a provisional hypothesis.

This hypothesis would be greatly strengthened if the shell were found in any other of our ports which trade or have traded with Russia or Finland—e.g., Newhaven and Wisbech—where I would suggest that search be made.

And, lastly, it would vastly increase its probability if the species were found to exist in some of the low-lying marshes along the Russian or Finnish coasts.

Had the shells come from Norway, Sweden, or Prussia, it is likely that it would have been discovered ere now by some of the keen investigators of those countries, but it is not so likely that conchologists have wandered along the low-lying shores of Russia and Finland, which shores, from personal knowledge, I can testify to being extremely desolate.

It may be remembered that the habitat of *P. jenkinsi* is slightly brackish dykes, such as timber is likely to be stored in while awaiting shipment.

In all the three known localities the water is usually fresh and from one to three miles from the sea. At Sandwich the shell was associated with *Sphærium corneum* and *Valvata piscinalis*; the water was then fresh, but possibly at high tides the salt water of the tidal Stour may get into the dyke through the sluices which I observed.

At Countess Weir it occurs in a small brook which runs into the Exe, whither salt water percolates, though not to any extent, and *Pisidium fontinale*, *Planorbis albus*, *P. contortus*, *Limnæa peregra*,* and *L. truncatula* were associated with it among the Anacharis weed, which was plentiful.

I have had the curiosity to go through 1256 specimens from Topsham to find the approximate ratio of the carinated to the uncarinated forms; I find only $9\frac{1}{2}$ per cent. are uncarinated.

* *L. peregra* is well known to exist and thrive in brackish water, and I have found *Pl. vortex* and *Pl. spirorbis* in a very salt marsh at Dovercourt, near Harwich.

Hyalinia glabra in Northamptonshire.—In Mr. W. D. Crick's carefully-compiled 'List of the Mollusca of Northamptonshire,' vol. iv., p. 247, attention is called to the absence of *H. glabra* amongst other species. I have been fortunate enough to find two live specimens, and also one of the *viridula* form of *H. alliaria*, which is also omitted in the list, at Bratfield, near Northampton.—I. E. ADAMS, Jan. 22, 1893.

OBSERVATIONS ON THE MISPLACEMENT OF
THE NAMES OF TYPE AND VARIETY
IN *HYALINIA PURA*.

BY W. NELSON AND R. STANDEN.

(Read before the Conchological Society, December 7 1892).

The great preponderance of the whitish form of this species over the brown, wherever we have collected, has long seemed to us a remarkable circumstance, and careful comparison of notes with many friends, whose experience has been the same as our own, further confirmed the suspicion that something must be wrong in the definition of type and variety as given in Jeffreys' 'British Conchology.'

Being together in the neighbourhood of Newcastle, in August last, we paid a visit to the Museum there expressly to have a look through Dr. Joshua Alder's collection, and were pleased to find in it a tablet containing a plentiful series of the white form (var. *margaritacea* Jeff.) mounted and labelled, in Alder's handwriting, as the type of *H. pura*; and on the next tablet three specimens of the brown form labelled '*H. pura* var.' This, in itself, appears to us sufficiently conclusive evidence that what we and others have been taught to consider the *variety* is really what Alder intended for *type* when he described the species, and that var. *margaritacea* Jeff. is a misnomer. We will, however, quote descriptions from all the authors whose works we have been able to consult, and it will be seen that the majority of the evidence is corroborative.

The species was first made known by Alder in 1830, and though a well-marked species, at once became a source of error. For Jeffreys, in 'A Supplement to the Synopsis of the Testaceous Pneumonobranchous Mollusca of Great Britain,' read before the Linnean Society, June 21st, 1831, dismisses it very curtly as *Helix nitidula* var. (=placing *H. pura* Alder as a synonym).

Dr. Turton in his 'Manual of the Land and Freshwater Shells of the British Islands,' 1831, describes the shells as being 'glossy, of a pale horny crystalline transparency,' and makes no mention of any variety.

We now come to what we consider the best manual that has yet been written on our land and freshwater shells, viz. : 'Turton's Manual,' revised and enlarged by J. E. Gray, 1840. The type is described as 'rather shining transparent white,' but he also says 'Var. shell pale-horn colour'; and under this he puts *Helix nitidosa* Fér. (Tab. Moll.)—*not synonyma*.

Macgillivray, in 'Molluscos Animals of the Counties of Aberdeen, Kincardine, and Banff,' 1843, describes the shell as 'transparent, moderately glossed, greenish white.' No variety given.

In Forbes and Hanley's 'History of British Mollusca and their Shells,' vol. 4, 1853, the shell is described as 'white, or occasionally very pale-horn colour.' No variety mentioned.

Moquin Tandon, in his 'Hist. Nat. des Mollusques,' 1855, describes the shell as 'un peu brillante, blanchâtre, ambreé, ou roussâtre, tirant quelquefois sur le verdâtre,' and gives var. *viridula* Menke ('Coquille un peu plus pâle, légèrement verdâtre'), and *Helix nitidosa* Fér. ('sans caractères').

J. G. Jeffreys, in 'British Conchology,' 1862, describes the shell as 'semi-transparent, light-horn colour, with a yellowish or reddish tinge on the upper side.' Var. *margaritacea*—'shell pearl-white and nearly transparent.'

Ralph Tate, in 'The Land and Freshwater Mollusks of Great Britain,' 1866, says 'Colour white, rarely very pale amber,' and does not give a variety.

Rimmer, in his 'Land and Freshwater Shells of the British Isles,' 1880, quotes from 'British Conchology,' *verbatim*.

In Kobelt's 'Catalog,' 1881, two varieties of *H. pura* are given, viz., var. *viridula* Menke, and var. *lenticularis* Held—of the latter we are unable to give description.

L. E. Adams, in his 'Collector's Manual of British Land and Freshwater Shells,' 1884, partially follows Jeffreys, and describes the shell as 'dull, semi-transparent, light-horn colour.' Var. *margaritacea*—'pearl white and nearly transparent.' Mr. Adams informs us that he took the brown form as the type from Jeffreys' work, but, as he did not observe any tinge of red, or that the brown colour was on the upper side alone, he spoke of the shell as he saw it.

Rev. Canon Norman, in his 'Museum Normanianum' Catalogue, 1890, gives var. *lenticularis* Held; but in his 'Revision of British Mollusca' (Annals of Nat. Hist., 1890), he does not give any variety of *H. pura*.

We consider that sufficient evidence has been produced to warrant the expulsion of var. *margaritacea* Jeff. from our British List, and if a varietal name is required at all, it should be given to the brown form. The question of the relative frequency between the brown and white form has, of course, nothing to do with Alder's naming, and is simply interesting as pointing to the appropriateness of his type being fully recognised. In his 'Catalogue of the Mollusca of Northumberland and Durham,' 1848, Alder gives var. *nitidosa* Fér., and he evidently believed the brown form to be *nitidosa* of that author. Gray evidently did not agree with this; and Jeffreys in 1829 put *nitidosa* as a variety of *H. cellaria*. On consulting Férussac's work we can find no description of *nitidosa*, and Moquin Tandon, as already shown, quotes it without giving any characters. But Férussac says '*Helix nitidosa* nobis=*Helix nitidula* var. χ ' (Drap., Hist., pl. viii., fig. 21—22). This is extremely conflicting, otherwise we would have suggested var. *nitidosa* as a fitting name for the brown form, to take the place of var. *margaritacea* Jeff.

LIST OF LAND AND FRESHWATER
MOLLUSCA OCCURRING IN THE MAIDSTONE
DISTRICT.

BY H. ELGAR AND H. LAMB.

(Read before the Conchological Society, March 4th, 1891).

[*The specimens illustrating this paper have been kindly presented to the Conchological Society by the Authors*].

The following list is not put forward as an exhaustive one, as will be seen by the absence of some species, which in all probability occur in the district, viz., of the genera *Pisidium*, *Ancylus*, *Vertigo*, etc.

The physical aspect of the district is varied; we have the Chalk Hills to the north, the Ragstone range in the south, divided by the Folkestone Sand, which runs east and west at the foot of the Chalk; it is watered by the Medway, with its tributaries and marshes, also several large ponds and streams.

This part of Kent has been but little worked by conchologists, and will no doubt eventually yield a good many not in this list.

Arion ater (L.). Common.

A. ater var. **rufa** (L.).

A. ater var. **alba** (L.).

A. hortensis Fer.

Amalia marginata Müll.

Limax maximus L.

L. flavus L.

Agriolimax agrestis L.

Testacella scutulum Sow. Obtained several.

Vitrina pellucida (Müll.). Generally distributed.

Hyalinia cellaria (Müll.). Common.

H. alliaria (Miller). Common.

H. glabra (Stud.). Common.

- H. nitidula* (Drap.). Common.
- H. nitidula* var. *helmii* (Alder). One.
- H. pura* (Alder). Occurs sparingly, and the same may be said of the two following :—
- H. crystallina* (Müll.).
- H. nitida* (Müll.).
- Helix rotundata* Müll. Common.
- H. rotundata* var. *alba* Moq.
- H. aculeata* Müll. Not common.
- H. pulchella* Müll. Old walls, common.
- H. lapicida* L. Several localities.
- H. pomatia* L. Moderately plentiful in three localities.
- H. aspersa* Müll. Common.
- H. nemoralis* L. Common.
- H. nemoralis* var. *libellula* (Risso).
- H. nemoralis* var. *rubella* Moq.
- H. nemoralis* var. *castanea* Moq.
- H. hortensis* Müll. Common.
- H. hortensis* var. *albina* Moq.
- H. hortensis* var. *lutea* Moq.
- H. hortensis* var. *incarnata* Moq.
- H. hortensis* var. *arenicola* Macgill.
- H. arbustorum* L. Moderately common.
- H. cantiana* Mont. Very common.
- H. cantiana* var. *albida* Taylor.
- H. cantiana* var. *pyramidata* Colb. Obtained once.
- H. rufescens* Penn. Common.
- H. hispida* L. Generally distributed.
- H. hispida* var. *albida* Jeff.
- H. hispida* var. *hispidosa* Mouss. Not common.
- H. granulata* Alder. Moist places by the Medway.
- H. fusca* Mont. In a disused chalk-pit.
- H. itala* L. Common on the chalk.
- H. caperata* Mont. Locally common.
- H. caperata* var. *major* Jeff.

- H. virgata* DaCosta. Locally common.
Buliminus obscurus (Müll.). Generally distributed.
Pupa cylindracea (DaCosta). Common.
P. muscorum (L.). Scarce.
Vertigo pygmæa (Drap.). Common in one locality.
V. minutissima (Hartm.). Scarce.
Balea perversa (L.). Scarce.
Clausilia perversa (Pult.). Common.
C. rolpheii Gray. Moderately plentiful in several localities.
C. laminata (Mont.). Generally distributed.
Azeca tridens (Pult.). Scarce.
Cochlicopa lubrica (Müll.). Generally distributed.
Cæcilioides acicula (Müll.). Two localities.
Succinea putris (L.). Common.
Carychium minimum Müll. Generally distributed.
Planorbis albus Müll. Medway, ponds and with the following :—
P. contortus Müll.
P. vortex (L.).
P. carinatus Müll.
P. complanatus L.
Physa fontinalis (L.). Upper Medway.
Limnæa peregra (Müll.). Very common.
L. auricularia (L.). Two localities.
L. stagnalis (L.). One locality, a small pond by the road-side, plentiful.
L. palustris (Müll.). Medway.
L. truncatula (Müll.). Medway and small streams, common.
Cyclostoma elegans (Müll.). Very common.
Neritina fluviatilis (L.). Upper Medway, one locality.
Viviparus viviparus (L.). Upper Medway, common.
Bythinia tentaculata (L.). Medway and large ponds, common.
Valvata piscinalis (Müll.). Upper Medway.
Unio tumidus Phil. Medway, common.

U. pictorum (L.). Common with *U. tumidus*.

Anodonta cygnea (L.). Medway and large ponds, common.

A. anatina (L.). With *A. cygnea*.

Sphærium corneum (L.). Common, Upper Medway.

S. rivicola (Leach). Medway, above Maidstone, common.

S. lacustre (Müll.). Lower Medway, in a ditch.



Helix nemoralis in the Pyrenees.—During a short stay at Eaux-Bonnes, in the Pyrenees, about 3,000 feet above sea-level, I was struck with the large number of white-lipped specimens of *Helix nemoralis*. This is an extremely common species in the Pyrenees, and at the locality mentioned the dark- and white-lipped varieties are equally common and generally found under the same stone. The variety is, I think, the one first recorded as British by Mr. J. W. Taylor under the name of *albolabiata* Von Mart. (Jour. of Conch., vol. iv.). The ‘*forma gallica*’ of Westerlund (Fauna Europ., 1876) again seems to me the same variety. A very large number of conchologists are still under the impression that every white-lipped nemoralis-like snail is *Helix hortensis*, and I am sure a number of wrong records have in this way crept into local lists. I did not find a single specimen of true *H. hortensis* in the Pyrenees, and although some writers state that it is found in Spain and Portugal, I think it is highly probable, as indeed Westerlund states, that it does not occur in those countries. In order to make sure that the white-lipped specimens really were *Helix nemoralis*, and not large *H. hortensis*, I dissected some of them, and found that their anatomy agreed with the description of the former. Even without looking at the dart, the long flagellum, and the short and simple digital glands, distinguish this species at once from *H. hortensis*.—R. F. SCHARFF, Dublin, Nov. 9, 1892. (Read before the Conchological Society, Dec. 7, 1892).

THE LIFE-HISTORY OF *ARION ATER* AND ITS
POWER OF SELF-FERTILISATION.

BY F. W. WOTTON.

(Read before the Conchological Society, Nov. 4, 1892).

The study of slug life does not appear to have been very enthusiastically entered upon by British malacologists, and the text-books and other works on the subject written by our own countrymen generally contain statements that have been copied from continental writers as well as from the older English authors without any attempt having been made to verify or disprove them. Thus many inaccuracies have been perpetuated.

This, I feel, is a reproach to us as a Conchological Society, and in laying the present life-history before the members, it is with the earnest hope that others may be induced to take up the work, and carry it on until the whole of the British slugs have been dealt with in detail.

The facts I am about to adduce are solely the result of my own observations, and I may here state that during the whole time I was engaged working out the life-history of this lowly creature, I watched it at intervals each day and part of each night with but few intermissions.

Arion ater is one of the largest British slugs. It averages in length when fully extended from $3\frac{1}{2}$ to 7 inches from the tip of the tail to the ends of the tentacles. Fine specimens are occasionally met with which exceed even the latter length—one of the slugs I experimented with totalling $7\frac{1}{2}$ and another 8 inches. Although this species has been named *ater*, they are not by any means all black, as the name implies, but are to be met with in various shades of orange, brown, yellow, and cinereous, sometimes mottled or streaked and often unicoloured. This peculiarity has given rise to a perplexing number of varietal names, and I would here ask, in all sincerity, if the time occupied by those who seem to make a speciality of seeking out

microscopical differences in colour mutations, seemingly for the purpose of appending their names to hair-splitting varieties, or in hunting up obsolete names, with the apparent object of making sweeping changes in the present nomenclature—which can only cause endless confusion—would not be more profitably spent in studying the habits and structure of some of our less-known molluscs?

On the first day of August, 1889, I obtained two fine specimens of *Arion ater* whilst on a collecting expedition. The colour of one was a uniform dark-reddish brown, the other uniform light yellow; both having the deep-orange fringe round the foot characteristic of the variety *rufa*. I had a box made for their reception, which had a teak-wood bottom, glass sides and ends, and a tightly-fitting, portable, perforated zinc top. It was of the following dimensions:—15 inches long, 8 inches wide, and 7 inches deep. The bottom was covered with turf, about 2 inches deep, on which was placed two or three lime-stones, and also a pot containing water. The turf was renewed weekly and the water daily. On the fifth of August the two Arions took possession of their new abode, where they seemed as happy and contented as slugs could well be. On the tenth of the following month I detected them in the act of conjugation, the connection lasting about twenty-five minutes. From this time until the eggs were deposited, the animals assumed rather a sickly appearance, the colours waxed duller, and the bodies got somewhat dry, apparently on account of a scarcity of slime.

The dates on which the batches of eggs were deposited and the number in each batch were as follows:—

THE LIGHT-YELLOW <i>Arion</i> .				THE REDDISH-BROWN <i>Arion</i> .			
Oct. 13 and 14, 1889	...	246		Oct. 10, 1889	...	...	80
Oct. 26, 1889	...	9		Oct. 16	...	...	110
Nov. 10	...	121		Oct. 25	...	...	77
Nov. 30	...	101		Nov. 8	...	...	82
				Nov. 17	...	...	47
Total	...	<u>477</u>		Total	...	<u>396</u>	

The 246 eggs is the largest number I have ever seen in one batch. The animal commenced its task on the 13th October, at ten a.m. Two hours later it had excluded 60. After this the rate of deposit was much slower, for at twelve p.m. it had only added 107. Between this time and eight the next morning thirty more appeared, and at three p.m., thirty hours afterwards, it deposited an additional 49, the whole time occupied being forty hours. The slug never altered from the position it took up at first, but lay on the *surface* of the ground with its head drawn up underneath the mantle and inclined to the left side, the mantle itself being lifted just above the reproductive orifice. It took not the slightest notice when touched, even if taken into the hand, but went unconcernedly on with its occupation. Two hours after producing the last egg the Arion began to move about in quest of food (having fasted for some 50 hours) and finding the half of a raw potato quickly demolished it. After this meal it went into the bath with seeming enjoyment, remaining submerged for more than an hour. On emerging the creature looked as well as ever, but was considerably reduced from its original size.

Whilst the animal was excluding the eggs I kept a spoon in a position to catch them as they fell ; when the spoon was full I replaced it with an empty one. I was thus enabled to keep the eggs clean, and also to count them correctly. The eggs, which are somewhat whitish and semi-transparent, are loosely cemented together by a mucous secreted by the slug. They are generally deposited in secluded places, such as the interior of decayed tree stumps, under stones and other substances, and sometimes in holes sunk into the earth by the parent. In shape they are slightly elliptical, and average in size 4 mm. by 3 mm. Larger specimens sometimes occur, which measure 6 mm. by 5 mm. Here and there an egg will be found contracted in the centre, as if a string were tied round it, giving it the appearance of a double egg.

The time required for hatching varies considerably, and is largely influenced by circumstances and surroundings. In the case under notice it varied from sixty to seventy-four days. The time is prolonged by dryness and cold, a continued dryness being fatal to the embryo. Extreme cold and extreme heat have a like result. I have frequently exposed them during a hard frost, but none of the eggs so treated ever produced young. The minimum time is reached in warm, damp situations, when the young slug is sometimes excluded in forty days.

It will be as well to mention here that the eggs deposited in one batch—even if within an hour or so of each other—do not hatch simultaneously as may be supposed, the intervening time being often several days.

Here are the particulars of one deposit which may be taken as a fair example :—

DEPOSITED BY LIGHT-YELLOW ARION.

		<i>Dates when Hatched.</i>				<i>Number.</i>
<i>Nov. 30th, 1889.</i> 101 Eggs.	{	January 16th, 1890	...	...	...	2
		„ 17th, „	...	...	...	2
		„ 18th, „	...	...	...	18
		„ 19th, „	...	...	...	13
		„ 20th, „	...	...	...	17
		„ 21st, „	...	...	...	10
	{	„ 23rd, „	...	...	...	20
Total . . .						82

The remainder were unproductive.

About ten or twelve days before the baby Arion emerges, the eggs begin to turn yellow, which deepens as time goes on. They also get more opaque. Under a low power the slug can be seen moving inside the shell, and it is most interesting to watch its introduction to the world. This is best seen by placing the egg on a looking-glass. The inmate gradually increases in size until a fine crack becomes visible; this gradually enlarges until the shell is split up, or one of the ends opens, and the slug is able to crawl out. Some of them, when nearly clear of the shell, will back or crawl into it again, and curl themselves up

within. There they rapidly increase in size and soon force the shell completely off. After lying perfectly still for a time, it will erect its head, turn it about and survey its surroundings in a manner most amusing to witness. After a little more manœuvring, it crawls away and betakes itself to the damp earth, where it soon sinks beneath the surface. Here the young Arion remains for four or five days without attempting to take food. When it reappears above ground to commence the responsibilities of life it has increased to nearly double its original size.

The average length of the Arion immediately after its exclusion from the egg is 9 mill.; in five months it increases to 56 mill. After this time it grows less rapidly and attains its full size about the middle of the second year.

The young slugs are light in colour at first, but the colour is subject to variation; it usually, however, gradually gets deeper until the animal has attained the age of four or five months, when it becomes permanent. When the Arion is about seven or eight days old, the dark lateral lines appear, but these are not always constant, for they soon disappear again from some individuals, whilst others retain them. The fringe around the foot also alters or graduates in colour from light yellow to the beautiful orange tint characteristic of this variety. It becomes permanent about the same time as the colour in the other parts of the body.

It will be remembered that the total number of eggs deposited by the two slugs was 873. From causes which I will presently explain a large quantity of them were unproductive. It is worthy of notice that nearly the whole of the young slugs were similar in colour to the darkest of the parents, only about nine per cent. being coloured similarly to the light-yellow one.

I shall hope at a future date to return to the question of hereditary transmission of colour, and will only mention here that the kind of food or soil seems to exert no influence whatever on the coloration, for I have frequently taken several

varieties of one species in the same locality where similar soil and food were the common lot of them all. Again, I have often fed slugs on coloured paper—a kind of food for which, by the way, they seem to have a great partiality. Now little if any of the colouring matter is absorbed or digested by the animal, the excrement being invariably of the same colour as the paper it had partaken of. This remark also applies to carrot, potato, etc., and it is very curious to see the little heaps of excreted matter of different colours jotted here and there after animals had been supplied with diversely-coloured food.

From the above facts I am led to infer—without being in the slightest degree dogmatic on the point—that, whilst the colour of the parent is transmitted to the young in perhaps the majority of cases, in some it is constitutional and peculiar to the individual. As yet no satisfactory reason can be given which will account for these colour-changes.

Arion ater is carnivorous and herbivorous, but I have seldom seen them take animal food. At times they will eat the slime and epidermis from off each other's back, which means death to the victim. The strangest part of it is that the creature so operated upon will go on eating its own food apparently indifferent to, or unconscious of the fact that it is being slowly murdered. Occasionally it will make an ineffectual attempt to shake its assailant off, and then resume its meal with seeming content.

They possess the power of existing for several weeks without solid food, providing a plentiful supply of moisture is obtainable, although under such conditions growth is arrested and the animal becomes considerably dwarfed in size. Without food or moisture life cannot be supported beyond three or four days. A bath is a favourite pastime with this mollusc, which it seems to thoroughly enjoy, and it will often remain submerged for a considerable time. I have known them recover after having been completely submerged (compulsorily) for nearly three days.

In common with other slugs, this species is infested with a small white parasite, which occasionally visits it in considerable numbers, darting about over its body and in and out of the pulmonary cavity without ever seeming to rest. I have noticed a quantity of them swimming about on the water after their benefactor has taken a bath ; probably the Arion resorts to this expedient to rid itself of its strange guests when they become too troublesome.

Once more reverting to the eggs. On carefully weighing them, I found there were 624 to an ounce. This was exactly the weight of the light-yellow slug just before it commenced depositing. In excluding 246 eggs, it parted with three-eighths of its own weight in thirty hours ; whilst from Oct. 13th to Nov. 30th (forty-eight days) 477 were produced, the total weight of this number being slightly over three-fourths of the weight of the parent slug. What astonishing fecundity !

Considering the quantity of eggs produced, it seems surprising that there should not be a plague of slugs ; but they are not nearly so numerous as the above facts would seem to warrant. Let us now consider the causes that effect their reduction.

In the first place, very many of the eggs prove naturally unfertile ; then the parent often turns cannibal and devours them, or, for the matter of that, the eggs of any other species—it is not at all fastidious in this matter. Again, centipedes, ants, and other insects prey on them ; but the greatest enemy of all is the larva of a small fly, which punctures a minute hole in the shell, wriggles itself inside, and eats out the interior. These larvæ occur at times in such vast numbers that the earth in particular spots has the appearance of a moving mass of life ! Many a nice batch of eggs I have had destroyed by this industrious creature, and many are the expedients I have employed to crush it out, but without success ; it is so perseveringly persistent. Lastly, come the birds, who pick off the infant slugs whenever an opportunity occurs. So, between the constant

attention of all these enemies, fortunate indeed is the Arion who lives out the full term of its natural existence, which generally terminates at the end of the second year or early in the third.

A great many slugs die soon after the exclusion of the eggs, especially when a large number has been deposited, the effort apparently being too much for their vitality. Oft times the creature dies a seemingly painful death. Little blisters form on the margin of the respiratory orifice, which gradually increase in size until the aperture is completely closed, and the Arion dies slowly from suffocation. A short time before death, the shield is elevated into a hump by the air confined in the pulmonary cavity. This swelling, which is elastic to the touch, gives the animal a somewhat ludicrous appearance. Death is also caused by the attack of an internal parasite, the effect of which has a very peculiar result. The superior tentacles, which are partly exerted, thicken at the base, and the animal loses the power of projecting or withdrawing them. It also becomes costive; finally, the digestive organs are projected some distance out of the mouth, the body becomes rigid, and death ensues in two or three days.

Arion ater is monœcious—that is, the sexes are combined in the same individual; therefore, each slug has the power of producing eggs. It develops both spermatozoa and ova, but, it has been asserted, not at the same time. It occurred to me that, under these conditions, the Arion, when unable to find a mate, possibly possessed the power of self-fertilization, and I resolved to try and ascertain whether it did or not.

I will now give the result of my investigations, by which I discovered that they do possess this power. Out of one of the batches of young slugs produced by the light Arion, I selected three of the strongest and healthiest. These I placed each in a separate box made specially for the purpose, thus completely isolating them. The boxes were provided with glass fronts, which commanded a full view of the interior, and so every movement of the occupant could be noted.

The young Arions were placed in these boxes at the latter end of February, 1890. On the 30th April one died, and on the 8th June a second followed its unworthy example, and I had to confine my attention to the sole survivor, which fortunately lived and thrived and we became great friends. It was supplied with fresh food and water daily, the turf and soil being changed every week, and I paid it every attention. As the months rolled on and December was ushered in without any sign of eggs, I began to despair; however, I persevered, and great was my delight when, on the 11th January, 1891, my friend presented me with two. Certainly not much of a beginning, but there they were. I carefully removed these eggs from the box and placed them in a pot of damp earth, anxiously watching them day after day, lest the animal should deposit no more. Imagine my feelings when examining them on the twelfth day to find the diabolical larvæ in full possession! I there and then registered a vow of extermination against all flies, for I felt all my labour had been in vain. However, my friend proved faithful to its trust, and ultimately presented me with more eggs. I will now give particulars of

EGGS DEPOSITED BY SELF-FERTILISED *Arion ater*.

<i>Date of Deposit.</i>	<i>No. Deposited.</i>	<i>Remarks.</i>
January 11th, 1891	2	Singularly enough these were all what I termed double eggs. ∞ Each of them fell a victim to the larvæ.
„ 25th, „	2	
February 11th, „	2	
April 3rd, „	60	... Slugs began to appear on May 21.
„ 15th & 16th	70	{ The Arion was eighteen hours depositing this batch. Eggs began to hatch out on May 28th.
„ 29th, „	53	
May 10th, „	34	
„ 28th, „	27	{ Unfertilized, eggs very small.
June 7th, „	6	
„ 30th, „	6	
Total ...	<u>264</u>	

There is one interesting point that I will draw attention to, that is, the difference in the length of time taken in depositing

the whole of the eggs between this slug and the pair that fertilised each other. In the former case it was 172 days, in the latter only 48 days—being a difference of 124 days.

So far I have not been able to find any writings touching on self-fertilization in hermaphrodite gasteropods, and the point is well worth further experiment, in the course of which the ovatestis should be examined to see if it produces ova and sperms at the *same time*, or whether the latter are stored up in the seminal receptacle *before* the ova ripen. Unfortunately I was unable to prosecute my investigations any further then, and I have not been able to devote the amount of time such a proceeding requires since.

For the purpose of shewing the development of the slug within the egg, I prepared for sectioning six eggs on the day of exclusion, and six eggs each succeeding day until the slug was fully formed. This I hope to make the subject of a future paper.

CARDIFF, *October 13th, 1892.*

Pisidia near Leicester.—The simultaneous occurrence of all the British species of the genus *Pisidium* is perhaps unusual enough to be worth recording. When at Aylestone, near Leicester, last July, I found the following forms within a space of five or six yards, in the Union Canal, near its junction with the river Soar:—*P. amnicum*, *P. fontinale* and v. *henslowana*, *P. pusillum*, *P. nitidum* v. *globosa*, and *P. milium*. *P. fontinale* v. *henslowana* and *P. pusillum* were very abundant; the others occurring more sparingly. *P. milium* and *P. nitidum* are additions to Mr. Quilter's 'List of Leicestershire Shells' (Trans. Leices. Lit. and Phil. Soc., 1888) as is *Bythinia leachii*, which I took in the canal at the same spot.—CHARLES OLDHAM, Ashton-on-Mersey, *Oct. 15, 1892.* (Read before the Conchological Society, *Jan. 11, 1893*).

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

PROCEEDINGS.

207th MEETING, WEDNESDAY, DECEMBER 7th, 1892.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the Chair.

Library Purchases announced: M'Nicholl's Handbook for Southport (with list of Shells), second edition, 1861; Venables' Guide to the Isle of Wight (with G. Guyon's list of Mollusca), 1860; Turton's Manual of British Shells, 1831; H. K. Jordan's Catalogue of British Mollusca, 1866; Besley's Handbook of North Devon (with list of Mollusca), n.d.; and Ramsay's Geology of the Island of Arran, 1861.

Donations to the Library announced and thanks voted:.

From the respective Editors: L'Echange Revue Linneenne, for October 15th and November 15th, 1892; the Naturalist and Feuille des Jeunes Naturalistes for December, 1892.

From the Trustees of the Australian Museum: Report for 1891.

From the respective Societies: Proceedings of Linnean Society of New South Wales, vol. 7, part 1; Abstract Proceedings, Sept. 28th and Oct. 26th, 1892; Transactions of Yorkshire Naturalists' Union, part 17.

From the Author, Mr. B. B. Woodward: Papers (1) On the Radula of *Paludestrina jenkinsi* and that of *P. ventrosa*, 1892; (2) On the Mode of Growth and the Structure of the Shell of *Velates conoideus* and other Neritidæ, 1892.

Donations to the Collections announced and thanks voted:.

From Mr. William Baillie: *Helix aspersa*, *H. arbustorum* and varieties, *H. cantiana*, *H. rufescens*, *H. ericetorum*, *H. virgata*, *H. pulchella*, *H. rotundata*, *H. acuta*, *Vitrina*, *Clausilia perversa*, and *Hyalinia fulva*, all from Brora, some being the wild progeny of introduced specimens.

From Mr. Lionel W. Hinxman: *Balea*, *Pupa cylindracea*, *Cochlicopa lubrica*, *Clausilia perversa*, *Bulimus obscurus*, *Helix arbustorum*, *H. hortensis* var. *lutea* 12345, and *H. rotundata* from Dufftown, Banffshire; and *Unio margaritifera* from the river Spey near Aberlour, Banffshire; the two last named being new authentications for the county.

From Mr. W. Denison Roebuck, F.L.S.: numerous shells from Wass Bank, near Coxwold, Yorkshire, including *Helix lupicida*, and from Settle.

Donation to Photograph Album announced and thanks voted:.

From Mr. William Moss: Two Photographs of the Radula of *Marisa cornu-arietis*, Trinidad.

Donation to Cabinet Fund announced and thanks voted :

From Mr. Hubert Elgar : 5s.

New Members Elected :

Mrs. H. G. Brierley, Glen View, Gledholt, Huddersfield.

Mrs. Janet Carphin, 1, Lauriston Park, Edinburgh.

Mrs. Louisa J. Smith, Monmouth House, Monmouth Street, Topsham, Devon.

Papers Read :

By Mr. Theo. D. A. Cockerell, F.Z.S. : '*Arion occidentalis*, an apparently new species' [to be printed in 'J. of C.'].
 By Mr. Lionel E. Adams, B.A. : 'A Theory as to the Possible Introduction of *Hydrobia jenkinsi*' [printed in 'J. of C.,' Jan., 1893, 148—150].

By Mr. Robert F. Scharff, B.Sc., Ph.D., M.R.I.A. : '*Helix nemoralis* in the Pyrenees' [printed in 'J. of C.,' Jan. 1893, vii., 157].
 By Messrs. Wm. Nelson and Robert Standen : 'Observations on the Misplacement of the names of Type and Variety in *Hyalinia pura*' [printed in 'J. of C.,' January, 1893, vii., 151—153].

By Mr. Loftus St. George Byne : 'The Marine Mollusca of Teignmouth' [printed in 'J. of C.,' April, 1893, pp. 175—188].

Exhibits :

Mr. Harold Wright, present as a visitor, showed a number of Marine Shells from various localities.

Correspondence :

A letter from the venerable naturalist, Rev. Leonard Blomefield, M.A. (formerly Jenyns), who is now in his 93rd year, was read, with reference to the type specimens of the *Pisidium nitidum* which he described in a paper published by the Cambridge Philosophical Society between sixty and seventy years ago, and mentioning that his cabinet of British Shells, wherein is a drawer devoted to *Cyclas* and *Pisidium*, is now in the Museum of the Bath Literary and Scientific Institution, where it is available for inspection by conchologists and students.

208TH MEETING, WEDNESDAY, JANUARY 11TH, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the chair.

Donations to the Library announced and thanks voted :

From the Editor : The Naturalist for January, 1893.

From the Society : Abstract Proceedings of Linnean Society of New South Wales, November 30th, 1892.

From the respective Authors : Mr. R. B. Newton on *Chonetes pratti* in Western Australian Carboniferous Rocks, 1892 ; and Mr. Chas. F. Simpson, Notes on the Unionidæ of Florida and the South Eastern States, 1892.

Donations to Collections announced and thanks voted :

From Mr. George Roberts : Numerous species of shells from Ledstone, Holywell Wood (near Pontefract), Water Fryston, Lofthouse, Milford, Rothwell Haigh, Wressle, and other Yorkshire localities.

From Mr. Wm. Baillie: *Helix cantiana*, *H. rufescens*, *H. itala* (= *erictorum*), *H. virgata*, *H. granulata* (= *sericea*), *Hyalinia cellaria*, and *Clausilia perversa* from Brora, some the progeny of imported specimens turned loose.

Donations to the Cabinet Fund announced and thanks voted :
From Lieut.-Colonel G. S. Parry : 5s.

Candidates Proposed for Membership :

Mr. Samuel Blackman Rosevear (proposed by Messrs. J. B. Rosevear and G. K. Gude) and Mr. Lewis John Shackleford (by Messrs. E. Collier and R. Standen).

Papers Read.

By Mr. Charles Oldham : 'Note on *Pisidia* near Leicester' [printed in 'J of C.,' April, 1893, p. 167].

A paper by Mr. E. W. Swanton was also read, entitled 'Some Observations on the Variation and Distribution of British Slugs,' in which were brought together the names of varieties as accepted in various published lists, as well as the number of counties for which the various species were recorded in the most recently published 'census.'

Exhibits :

The Recorder showed on behalf of Mr. H. R. Matthews, jun., of Partick, near Glasgow, a number of land shells from Troon, Ayrshire, and other Scottish localities. He also showed adult examples of *Helix nemoralis* var. *libellula* 12345, *H. hortensis* vars. *lutea* 12345, and *lutea* 00000 *minor*, and *H. arbustorum* from Dura Den, Fifeshire, collected 30th July, 1890, by Mr. W. Evans, F.R.S.E.; also a number of shells collected by Mr. W. C. Clarkson about Pateley Bridge, Ripley, and other localities in Nidderdale, including *Bulinus obscurus* from How Stean, *Azeca* from How Stean and Greenhow Hill, *Pisidium milium* from Darley, etc.

209TH MEETING, WEDNESDAY, FEBRUARY 1ST, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the chair.

Donations to the Library announced and thanks voted :

From the Editors : *Feuille des Jeunes Naturalistes*, January, 1893 ;
The Naturalist, February, 1893.

From the Society : *Proceedings of Royal Physical Society of Edinburgh*, 1891-92, vol. 11, part 2.

Donations to the Collections announced and thanks voted :

From Miss Amy Warren : A large series of the marine shells of Killala Bay, Ireland ; including *Solen siliqua* from the Inch, Killala ; *Pecten maximus*, *Lutraria elliptica*, *Cardium norvegicum*, *C. echinatum*, *Cyprina islandica*, *Natica catena*, *Mactra solida*, *Lucina borealis*, *Montacuta ferruginosa*, *M. bidentata*, and *Odostomia plicata* from Enniscrone, County Sligo ; *Fusus antiquus*, *Buccinum undatum*, *Tapes pullastra*, *T. decussata*, *Aporrhais pes-pelicanii*, *Ianthina*, *Axinus flexuosus*, *Lamellaria perspicua*, *Utriculus hyalinus*, and *U. truncatus* from Bartra Island ; *Mya*

arenaria, *Scrobicularia piperata*, *Cardium edule*, *Tellina balthica*, *Hydrobia ulvae*, and *Philine aperta* from the Moy Estuary; *Patella vulgata*, *Purpura lapillus*, *Pleurotoma costata*, *Saxicava rugosa*, *Anomia ephippium* and var. *aculeata*, *Cypræa europæa*, *Venerupis irus*, *Fissurella græca*, *Helcion pellucidum*, *Trochus umbilicatus*, *T. cinerarius*, *T. lineatus*, *T. cizephinus*, *Tectura virginea*, *Tapes pullastra* var. *perforans*, *Modiolaria discors*, *M. costulata*, *Turritella terebra*, *Nucula nucleus*, *Lacuna divaricata*, *L. pallidula*, *Phasianella pulla*, *Arca tetragona*, *Kellia suborbicularis*, *Thracia distorta*, *Lasæa rubra*, *Emarginula fissura*, *Rissoa striata*, *R. striatula*, *R. violacea*, *R. cingillus*, *R. parva*, *R. punctura*, *Nassa incrassata*, *N. reticulata*, and *Cyamium minutum* from Carrahubuck; *Mactra stultorum*, *Venus gallina*, *V. exoleta*, *V. linctæ*, *Donax vittatus*, *Ceratisolen legumen*, *Natica alderi*, *Actæon tornatilis*, *Tellina tenuis*, *T. fabula*, *Rissoa costata* and *R. membranacea* from Bartra and Enniscrone; *Mytilus edulis* and *Spiralis retroversus* from Killala Bay; and *Melampus myosotis* from Runroe, Co. Sligo; the whole forming a much appreciated addition to the Society's set of British Marine Mollusca, and illustrative of the donor's paper in the Journal of Conchology for October, 1892, vol. vii., pp. 98-107.

From Mr. William Baillie: A large series of the marine shells of the coast of East Sutherlandshire and the adjoining seas, including: *Lepton nitidum*, *Corbula gibba*, *Cardium fasciatum*, *Pleurotoma turricula*, *Trochus tumidus*, *Natica alderi*, *Velutina levigata*, *Tellina pusilla*, *Venus ovata*, *Circe minima*, *Leda minuta*, *Nucula tenuis*, *Pecten similis*, *P. tigrinus* and var., *Psammobia tellinella*, *Chiton levis*, *Ch. cinereus* and var., *Ch. marmoreus*, *Utriculus hyalinus*, *U. mammillatus*, *Bulla utriculus*, *Spiralis retroversus*, *Pleurotoma nebula*, *Pl. trevelyana*, *Philine scabra*, *Ph. angulata*, *Ph. punctata*, *Cylichna cylindracea*, *C. umbilicata*, *Astarte compressa*, *Venus fasciata*, *V. gallina*, *Natica montacuti*, *Odostomia albella*, *O. unidentata*, *O. acuta*, *O. decussata*, *O. pallida*, *Trichotropis borealis*, *Eulima polita*, *E. bilineata*, *Trophon truncatus*, *Defrancia linearis*, *D. purpurea*, and *Trochus grælandicus*, from fish stomachs, Brora; *Pholas crispata* from Brora shale; *Mactra stultorum*, *Lucina borealis*, *Venus exoleta*, *V. linctæ*, *Tapes virginea*, *T. pullastra*, and *Lutraria elliptica* from Brora drift; *Cardium norvegicum* from Dornoch drift; *Hydrobia ulvæ* from Little Ferry; *Rissoa soluta* and *R. punctura* from sand, East and West Sutherlandshire; *Natica sordida* from fish hooks, Brora; *Philine nitida*, *Utriculus obtusus*, *U. truncatulus*, *Homalogyra atomus*, *H. rota*, *Melampus bidentatus*, *O. acicula*, *O. insculpta*, *O. turrita*, and *O. dolioliformis* from Dornoch shell-sand, East Sutherlandshire; *Pleurotoma rufa* from Dornoch and Durness; *Skenea planorbis* from East Sutherlandshire; *Aclis unica* (= *Cioniscus unicus*) from sand, Brora; *Cæcum glabrum*, *Odostomia nivosa*, and *Eulima intermedia* from shell-sand, North and East Sutherlandshire; *Odostomia warreni*, *O. spiralis*, *Eulima distorta* and var. *gracilis*, from shell-sand and fish stomachs, Brora; *O. interstincta*, *O. rissoides*, *O. indistincta*, *Rissoa parva*, *R. violacea*, *R. inconspicua*, *R. striata*, *R. reticulata*, *R. cancellata*, *R. semistriata*, *R. membranacea*, *R. zelandica*, *R. costata*, and *R. cingillus* from shell-sand and fish stomachs, East Sutherlandshire; Mr. Baillie in his

letter stating that more than forty species of these had been determined for him by the late Dr. Jeffreys, shortly before his decease.

Donation to the Cabinet Fund announced and thanks voted :

From Mr. J. Bassett Dixon : A New Cabinet, which he desired should be devoted to British Marine Mollusca, and which the Council have decided to name 'The Dixon Cabinet,' with special thanks to Mr. Dixon.

New Members Elected :

Mr. Samuel Blackman Rosevear, 122, West Street, Fareham, Hants.

Mr. Lewis John Shackleford, Ripley College, Ripley, Derbyshire.

Papers Read :

A note by Mr. J. E. Cooper on '*Valvata piscinalis* monst. *sinistrorsum*' at Hunstanton, Norfolk West' was read, and illustrated by photographs [printed in 'J. of C.,' April, 1893, p. 174].

Exhibits :

On behalf of Mr. G. Trevor Lyle, was shown an example of *Helix pomatia* from North Wilts., found by him in 1890 near Devizes, at the foot of the Downs, and about a couple of miles north of the dividing line between North and South Wiltshire.

210TH MEETING, WEDNESDAY, MARCH 1ST., 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the chair.

Library Purchase announced : Sturm and Hartmann's *Deutschen Fauna*, 2 vols., 1813—1821.

Donations to Library announced and thanks voted :

From the author, Mr. John Brazier, F.L.S. : (1), On the Synonymy of *Helix (Hadra) gulosa* Gould, 1891 ; (2), Note on the Linnean *Murex corneus* found living on the Coast of the I. of New Caledonia, 1889 ; (3), Description of a new Cone (*Conus worcesteri*) from Mauritius, 1891 ; (4), Catalogue of the Marine Shells of Australia and Tasmania, parts i, Cephalopoda, and ii, Pteropoda, 1892.

From Mr. John Brazier, F.L.S. : Paper by Mr. C. Hedley on the Structure and Affinities of *Panda atomata* Gray, 1892.

From the respective Editors : Feuille des Jeunes Naturalistes for Feb. 1893 ; the Naturalist and the British Naturalist for March, 1893.

From the Linnean Society of New South Wales : Proceedings, 2nd series, vol. 7, part ii, 1892 ; Abstract Proceedings, Dec. 28, 1892.

Donation to Photograph Album announced and thanks voted :

From Mr. J. E. Cooper : Photographs of *Valvata piscinalis* monst. *sinistrorsum* from Hunstanton, Norfolk West, in illustration of his paper read at the previous meeting.

Donation to Cabinet Fund announced and thanks voted :

From Rev. W. L. W. Eyre, 5/-.

Donations to Collections announced and thanks voted :


From Mr. Lionel E. Adams, B.A. : *Hyalinia glabra* and *H. alliaria* var. *viridula* from Bratfield near Northampton.

From the late Miss E. B. Fairbrass : *Helix hortensis* vars. *lutea* 10045 (= *debeauuxia* Loc.) and *lutea* 10005 (= *michaudia* Loc.) from Ospringe, Kent ; and *H. caperata* var. *major* from Faversham, Kent.

From Mr. W. Baillie : *Limnea peregra* and var. *lineata*, *Pisidium pusillum* and var. *obtusale*, *P. fontinale*, *Planorbis spirorbis* and *Pl. nautilus*, from Loch Brora (the last three being new authentications for the vice-county of East Sutherland) ; and *Cochlicopa lubrica*, *Balea*, *Vitrina*, *Pupa cylindracea*, *P. marginata* (a new county authentication), *Hyalinia crystallina*, *H. cellaria*, *H. pura*, *Helix arbustorum*, *H. virgata* (an imported species), *H. caperata*, and *H. pygmaea* from Brora.

From Mr. J. E. Mason : *Clausilia perversa* and *Cl. laminata* from Well Vale near Alford, Lincoln North.


Papers Read :

A paper by Mr. R. J. Lechmere Guppy on 'The Land and Freshwater Mollusks of Trinidad' [to be printed in 'J. of C.'].


A paper by the Rev. Herbert Milnes, giving a 'List of the Land and Freshwater Shells of the Peak of Derbyshire' [to be printed in 'J. of C.'].


A short note by Rev. J. W. Horsley, on '*Helix nemoralis* in the Pyrenees,' supplementary to that by Dr. Scharff [printed in 'J. of C.,' April, 1893, vii., 174].

A short note by Mr. Lionel E. Adams, B.A., on '*Hyalinia glabra* in Northamptonshire' [printed in 'J. of C.,' Jan. 1893, p. 150].

A paper by Mr. J. T. Marshall, entitled 'Additions to British Conchology,' bringing forward the names of numerous additions to the British Marine Mollusca made since the publication of Dr. Jeffreys' work of that name [to be printed in the 'J. of C.'].


Exhibits :

The Recorder exhibited the following shells received for authentication from Mr. William Evans, F.R.S.E. : *Arion minimus*, *Pisidium pusillum*, *Cochlicopa lubrica* and *Hyalinia crystallina* from Tushielaw, Selkirkshire (the two first named being new authentications for that county) ; *Helix pulchella*, *Pupa cylindracea* and *Vertigo pygmaea* from Elie, Fifeshire (the last named a new county authentication) ; and *Limnea glabra* from Bavelaw, near Balerno, Midlothian (a new record for Edinburghshire).

On behalf of Mr. Frederick W. Fierke were shown a couple of Driffeld Canal specimens of *Pisidium amnicum*.

On behalf of Mr. Lionel E. Adams, B.A., a number of slugs and shells from Solihull, Warwickshire, including *Arion minimus*, *A. circumscriptus*, *Hyalinia fulva*, *Helix aculeata*, *Vertigo pusilla*, *V. edentula* and var. *columella*, and many others of less moment.—W.D.R.



Helix nemoralis in the Pyrenees.—I can corroborate the observations of Dr. R. F. Scharff. At Lerans, near Pau, *H. nemoralis* was mainly of the *libellula* variety, and nearly half were white lipped. The shells were large, and could never be mistaken for *H. hortensis*, which was quite absent. So, too, at Pau, *H. hortensis* was absent and *H. nemoralis* common, fine, and richly coloured, while the *albolabiata* variety occurred, though not so plentiful. At Latresne, near Bordeaux, I found both *H. hortensis* and *H. nemoralis* (pace Dr. Sauerbie, the Curator of the Bordeaux Museum, who was emphatic in his denial of their being distinct species). At Tours I found both species, the *H. hortensis* being mainly var. *lutea*. At Poitiers I found only *H. hortensis*, and chiefly var. *lutea*. The generalization would seem to be that in France the more south one goes and the higher the altitude the more *H. nemoralis* displaces *H. hortensis*. So, when I went next year to the Alps, I expected to find *H. nemoralis*, but only found *H. hortensis*, except in one hotel garden, where the former was obviously imported with shrubs. Out of thousands of *H. nemoralis* I have examined in Kent, I have only found one var. *albolabiata*.—J. W. HORSLEY, Holy Trinity Vicarage, Woolwich. (Read before the Conchological Society, March 1st, 1893).

Valvata piscinalis monstr. sinistrorsum at Hunstanton, West Norfolk.—An example of this monstrosity was found at Hunstanton, in September, 1891, among a large number of typical specimens. The upper whorls are dextral, but by far the larger part of the shell is sinistral. The apex is turned to one side and almost inverted, giving the shell a very strange appearance. In size it is $5\frac{1}{2}$ mills. by 4 mills. Several other monstrosities occurred near the same spot. One shell was subscalariform, the last whorl being almost quite detached. Another specimen has the upper part of the spire twisted to one side (an example of this is recorded by Dr. Jeffreys in 'Brit. Conch.'). Two other shells were very much flattened, one of the two being nearly as flat as a *Planorbis*.—(Read before the Conchological Society, Feb. 1st, 1893, when a couple of microphotographs taken by the writer's brother, Mr. E. C. Cooper, were exhibited).—J. E. COOPER, Highgate, Jan. 25, 1893.

A CONTRIBUTION TOWARDS
A LIST OF THE MARINE MOLLUSCA OF
TEIGNMOUTH.

BY L. ST. G. BYNE.

(Read before the Conchological Society, December 7th, 1892; and also
read before the Manchester Branch).

The following pages contain a record of the species which have occurred in Teignmouth Bay since 1886.

The shells have been obtained from the shores of the bay, from small trawlers belonging to the harbour, and from dredging expeditions which yielded many of the rarer species.

The sea drift referred to, occurred on the water marks between two spring tides in August, 1889, the only such occasion productive of small and minute species in quantity.

Anomia ehippium L. Mature and young specimens obtained by oyster dredging, attached to oyster shells, *Pecten maximus* and *Pecten opercularis*; young shells also from roots of weed.

A. ehippium var. *aculeata* Müll. The spined form; two specimens. It is rare here.

Ostrea edulis L. The oysters in our bay are large-sized and of fair quality.

O. edulis var. *parasitica* Turt. With the type.

Pecten pusio L. A few trawled, attached to various substances.

P. varius L. Trawled occasionally, and cast up on shore, but in each instance only small examples.

P. opercularis L. Trawled occasionally some distance off the harbour. These shell-fish are readily saleable here as most nutritious and delicious food, cooked in different ways. They are not quite so large as those obtained in the north.

P. opercularis var. *lineata* DaC. A few with the type.

- P. maximus** L. Dredged with *Ostrea edulis*, fine but not plentiful.
- Pinna rudis** L. Several fine specimens have been trawled, alive and dead.
- Mytilus edulis** L. The River Teign is famous for its mussels, the Midlands receiving large quantities of them.
- M. barbatus** L. One mature example trawled alive.
- M. adriaticus** Lmk. A few cast up after a storm. Valves dredged only.
- Modiolaria marmorata** Forb. Well distributed.
- Nucula nucleus** L. Occurs together with the next species in the muddy portions of the bay.
- N. nitida** G. B. Sow. With the last.
- Pectunculus glycymeris** L. A few small shells from the beach after a gale.
- Arca lactea** L. Three specimens trawled alive.
- Lasea rubra** Mont. Alive under rocks and stones.
- L. rubra** var. **pallida** Jeff. With the type.
- Kellia suborbicularis** Mont. Found on this coast in the red sandstone rocks inhabited by members of the *Pholas* family.
- Axinus flexuosus** Mont. A considerable number of adult and young specimens have been dredged alive in the mud of the bay, but rather locally.
- Diplodonta rotundata** Mont. Fresh specimens scarce.
- Cardium aculeatum** L. In 1886, a net which had been shot round a 'bed' of sprats became entangled and was broken by a shoal of these molluscs, a portion of them, numbering sixty-three fine shells, were brought in and were duly cleaned. Occasional shells trawled.
- C. aculeatum** var. **depressa** Mar. One specimen among the above.
- C. echinatum** L. A single adult specimen dredged alive, 1890.

- C. tuberculatum** L. Cast up after storms, alive and dead ; common.
- C. edule** L. Occur plentifully in the bed of the River Teign. Some shells of unusually large size have been found. Coombe Cellars, three miles up the river, is noted for its cockles, which are often eaten there with cream.
- C. norvegicum** Speng. Trawled alive and dead ; common.
- Cyprina islandica** L. Trawled and oyster-dredged. The largest example obtained measured nearly five inches across.
- Venus exoleta** L. Trawled.
- V. lincta** Pult. Trawled.
- V. chione** L. Only valves cast up in the neighbourhood. No doubt it exists alive in the sands.
- V. fasciata** DaC. One dredged example, and valves on the beach.
- V. gallina** L. Common.
- Tapes virgineus** L. Trawled alive.
- T. virgineus** var. **sarniensis** Turt. With the type.
- T. pullastra** Mont. Common,
- T. pullastra** var. **perforans** Mont. Common in the rocks, especially those inhabited by members of the *Pholas* family.
- T. decussatus** L. Common.
- Lucinopsis undata** Penn. Sometimes thrown up alive on the beach amongst ridges of tangle-weed.
- Tellina crassa** Penn. Trawled.
- T. balthica** L. Occurs alive in the mud of the River Teign.
- T. tenuis** DaC. Common.
- T. squalida** Pult. A few examples on the beach.
- T. donacina** L. Scarce.
- T. pusilla** Phil. Scarce.
- Psammobia ferroensis** Chem. Trawled, oyster-dredged, and on the beach, both alive and dead ; common.
- P. vespertina** Chem. Is a scarce species here, and comparatively small.

- Donax vittatus** DaC. Common on the beach.
- Mactra solida** L. The common 'Hen' dredged in large quantities for food.
- M. subtruncata** DaC. Various-sized specimens trawled and dredged.
- M. stultorum** L. Fine trawled and beach specimens common.
- Lutraria elliptica** Lmk. Adult and young examples, both alive and dead, but chiefly from the beach.
- Scrobicularia piperata** Gm. Common in the mud of the River Teign, and taken from the mud of the harbour steam dredger.
- Solen pellucidus** Penn. Dredged in muddy parts of the bay.
- S. ensis** L. Common.
- S. siliqua** L. Common; does not reach such a large size as in the North.
- S. vagina** L. One from beach.
- Thracia papyracea** Poli. Dredged in the bay.
- T. pubescens** Pult. A fine example in a fresh state was trawled in the bay, July 19th, 1887, and a larger shell was unfortunately lost.
- Corbula gibba** Olivi. Live and dead examples dredged locally in muddy parts of the bay.
- C. gibba** var. *rosea* Bro. With the type.
- Mya binghami** Turt. One live specimen from the rocks.
- Saxicava rugosa** L. Plentifully distributed amongst sandstone rocks and in blocks of limestone on shore, and from trawled pieces of rock. Young shells often frequent the roots of *Lamellaria saccharina*.
- S. rugosa** var. *arctica* L. A few live and dead specimens in trawled refuse.
- S. rugosa** var. *pholadis* L. Occasionally with the type in blocks of red rock and limestone on shore.

Gastrochæna dubia Penn. A single live specimen from the centre of a loose block of limestone occupied by a large number of *Saxicava rugosa*. Also several live specimens from blocks of rock brought in by trawlers which have been compelled to come in, their trawl nets being broken. The valves being so fragile and lightly held together, it is often desirable to preserve the shell with the animal in it.

Pholas dactylus L. A few obtained alive at low spring tides from the rocks here, the largest measuring four-and-a-half inches long. The syphon of this animal was fully extended when first observed, but, after throwing up a cascade of water, it disappeared, and the shell was only found again by pickaxing more than twelve inches beneath the surface of the sandstone. The shell was dark shagreen in colour. This species is almost extinct here.

P. candida L. Does not occur so often as *P. parva*.

P. parva Penn. Have been common, but fine examples only in the reefs of rock at lowest spring tides.

Pholadidea papyracea Turt. A few live and dead adult and young examples from hard red sandstone rocks.

P. papyracea var. *aborta* Jeff. One example with the type.

Teredo norvegica Speng. Some live examples in a large piece of timber brought in by a trawler whose net had got fouled in part of an old wreck in the bay.

Dentalium entalis L. A few small and dead examples on the beach.

Chiton fascicularis L. A few in clefts of rocks, and amongst stunted mussels on the rocks, no doubt attracted by the excreta of the mussels.

C. marginatus Penn. Under smooth stones and amongst rocks between tide-marks.

Patella vulgata L. Common.

Helcion pellucidum L. Adult and young specimens amongst the roots of *Lamellaria saccharina*.

H. pellucidum var. **lævis** Penn. With the type.

Tectura virginea Mull. One live and some dead specimens from drift.

Emarginula fissura L. Cast up dead on the beach.

E. rosea Bell. Several trawled alive on rough ground, and dead specimens from drift.

Capulus hungaricus L. Trawled and oyster-dredged alive opposite the harbour; attached to oyster shells. Immersed in cold water the shell will soon become detached. A few had the shell-cavity tinged with pink and purple. Care should be taken, when extracting the animal, to preserve the epidermis, as this and the shape of the shell are the criteria of a cabinet specimen.

Trochus magus L. Common.

T. cinerarius L. Common on the rocks.

T. umbilicatus Mont. Common.

T. lineatus DaC. Common.

T. exasperatus Penn. A nice lot trawled.

T. granulatus Born. Five specimens trawled, and one dredged, all being alive.

T. zizyphinus L. Common, alive.

Phasianella pullus L. Large adults and young shells alive from various weeds on the rocks, but the former have generally occurred by themselves.

Lacuna crassior Mont. Adult and young shells trawled alive on rough ground.

L. divaricata Fabr. Adult specimens found alive on and under weeds on the rocks, also from off *Chorda filum* brought in by mackerel boats. Examples from the latter have been kept in confinement. These animals are extremely active, and will crawl up a glass vessel full of sea water and down the other side,

L. divaricata var. **quadrifasciata** Mont. Have occurred twice by themselves on weeds, and occasionally with the

type on the rocks and from *Chorda filum* weed from mackerel boats.

- L. puteolus** Turt. Found in great numbers on various weeds on the rocks here at low spring tides. Both light coloured and banded forms are present. Recent observation of certain rocks leads to the conclusion that in early spring the adults come in to deposit their ova on the nearest ones, and then retire to others in deeper water.
- L. puteolus** var. **clausa** Jeff. Light-coloured and banded examples sparingly with the type, but they do not attain a large size.
- L. puteolus** var. **expansa** Jeff. Fine light-coloured and banded examples, under similar conditions, living alone and with the type on various weeds.
- L. pallidula** DaC. The finest adults have been found living together on very isolated rocks, only accessible at the lowest spring tides or by boats, chiefly in the forks of *Chondrus crispus*.
- L. pallidula** var. **albescens** Jeff. The light yellow form, occurring with the type. Fine adults and young specimens from amongst the tangle-weed on ledges of rocks, but they are not frequently met with.
- Littorina obtusata** L. Common.
- L. rudis** L. A well-marked banded form from cockle-beds in the river.
- L. rudis** var. **saxatilis** Johnst. One specimen only.
- L. neritoides** L. Common.
- L. littorea** L. The 'winkles' are largely gathered for food.
- Rissoa cancellata** DaC. One fresh example trawled in the bay.
- R. punctura** Mont. Trawled alive; dead specimens in drift, but scarce.
- R. costata** Ad. Dredged, and dead examples in drift.
- R. parva** DaC. On various weeds on rocks, and from trawling, with other species.

- R. parva** var. **interrupta** Ad. With the type ; common.
- R. parva** var. **semicostata**. Intermediate between the type and var. *interrupta*. It is half ribbed and half smooth. A few with the type.
- R. inconspicua** Ald. Alive from trawled weeds, and dead from drift ; scarce.
- R. inconspicua** var. **variegata** Mohr. From drift, but has also occurred with trawled type specimens.
- R. albella** var. **sarsii** Lov. From drift.
- R. membranacea** Ad. A scarce species on our rocks. Trawled, and dead examples in drift.
- R. violacea** Desm. Trawled from weeds, and a few examples from amongst weeds on the rocks, with commoner species.
- R. costulata** Ald. Dredged and trawled and in drift, dead specimens from drift.
- R. striata** Ad. Under stones at low water mark, on spring tides.
- R. proxima** Ald. Live, fresh, and dead specimens dredged locally in our bay, with its congener, *R. vitrea*, in shelly mud.
- R. vitrea** Mont. Fresh and dead examples dredged locally in the bay. A small quantity of material from hard shelly ground brought up on the anchor of a small trawler yielded eight dead but good examples. One specimen from beach drift.
- R. fulgida** Ad. One dead specimen from drift.
- R. soluta** Phil. Dead specimens amongst drift.
- R. semistriata** Mont. From under stones at low water mark on spring tides ; also trawled alive with common *Rissoæ*.
- R. cingillus** Mont. Has occurred fairly plentifully amongst weeds on our red sandstone shores at low tides.
- Hydrobia ulvæ** Penn. From under stones on the mud banks of the River Teign.
- Barleeia rubra** Mont. One live specimen in weeds.

Skenea planorbis Fabr. Is a scarce shell alive, owing, perhaps, to the difficulty of obtaining the weed in which it dwells. Dead examples from drift.

Cæcum trachea Mont. Dead specimens dredged.

C. glabrum Mont. From drift.

Turritella terebra L. From rough ground, the bay being full of them. A fine white form has also been dredged.

Scalaria turtonæ Turt. Nine specimens dredged alive, this being the first occasion. Frequently trawled dead, and found more or less imperfect on the beach. This species seems to be more widely distributed than *S. communis*.

S. communis Lmk. Dredged on rough ground among *T. terebra*. One fine live adult, one small dead specimen, and one from drift.

Aclis unica Mont. One fresh example in drift.

Odostomia nivosa Mont. Alive on weeds trawled in the bay.

O. clavula Lov.— One dead example dredged.

O. rissoides Han. On isolated rocks on low tides, more or less covered with stunted mussels. This species has been, and is still to be, found living in colonies amongst and underneath the mussels, to whose excreta they may be attracted for existence. The *Odostomiæ* are not outwardly visible to the naked eye, but swarm on the removal of the mussels, or on being disturbed. A large dish piled up with a quantity of the mussels for examination, produced, after eleven days' picking off with a long hair pin, nearly two egg cups full of *O. rissoides*, consisting of adults of remarkable size down to the most minute. They perched themselves upright and spire downwards wherever moisture remained on the daily lessened quantity of mussels. They were very active, and shifted quarters if they were disturbed. If there were any doubt of this being a new habitat for the species, the fact of many of the adults

having the mark of a fairly fibred byssus, apparently derived from the mussels, should prove convincing. From the preceding facts, it seems that *O. rissoides* is a parasitic species.

- O. pallida** Mont. Dredged alive in mud, trawled alive on rough attachments and on *P. opercularis*.
- O. acuta** Jeff. Dredged alive and dead in mud.
- O. acuta** var. **umbilicata** Ald. Three trawled alive on separate occasions, and dredged dead in muddy ground—this is probably a new locality.
- O. unidentata** Mont. Dredged alive and dead.
- O. turrita** Han. Live examples from under stones at low water ; dredged dead.
- O. plicata** Mont. Live specimens under stones, but only once.
- O. insculpta** Mont. Trawled alive ; dredged alive and dead ; one example, with animal in it, amongst drift.
- O. diaphana** Jeff. Live specimens in a bucketful of *Zostera marina* trawled by a steam yacht ; dredged alive and dead.
- O. warreni** Thomps. Dredged alive and dead.
- O. dolioliformis** Jeff. Has been obtained on two occasions alive and in quantity from the lowest spring tide water marks of the littoral zone in this bay. Dead examples in drift.
- O. decussata** Mont. Dead in drift.
- O. indistincta** Mont. Dredged alive and dead in mud, and dead specimens in drift, all being of dwarf growth.
- O. indistincta** var. **brevior** Jeff. From a bucketful of *Zostera* trawled by a yacht.
- O. interstincta** Mont. One specimen only dredged alive.
- O. spiralis** Mont. Dredged alive and dead in mud ; live examples from under stones at low tides ; dead specimens in drift.
- O. rufa** Phil. Two dead examples in trawled refuse.

- O. lactea** L. Dwarf-sized forms dredged alive and dead in mud. They are fairly common, but only one large shell has occurred alive.
- O. pusilla** Phil. Dredged alive and dead with *O. lactea* in mud, but, like the latter, they also are mostly dwarfed.
- O. acicula** Phil. One dead example trawled.
- Eulima polita** L. Trawled alive in the bay, but not adult.
- E. distorta** Des. Trawled alive.
- E. bilineata** Ald. Adult shells trawled alive in the bay.
- Natica catena** DaC. Trawled occasionally, and cast up alive and dead on sandy ground.
- N. alderi** Forb. Fresh examples trawled.
- Adeorbis subcarinatus** Mont. In the J. C., vol. vi., p. 164, I recorded the occurrence here of this species alive on the 28th July, 1888, when ten specimens were obtained from one rock. In the fall of that year, some twenty more live examples were taken from another rock. It does not appear that this species had been previously found alive on the English coasts. A few dead specimens have been found in drift, and also dredged.
- Lamellaria perspicua** L. A magnificent lot of this species, adult and alive, were stranded in this neighbourhood, together with live young *B. hydatis*, fine *P. aperta*, and young *Lutraria elliptica*. Trawled alive. They have frequently occurred dead on the beach.
- Velutina lævigata** Penn. Fine adult and young specimens occasionally trawled alive on rough ground; dead examples on the beach.
- Aporrhais pes-pellicani** L. Obtained chiefly by oyster-dredging, some remarkably fine. Four specimens with four spurs each have occurred.
- Cerithium reticulatum** DaC. Three specimens trawled alive, and one from drift.
- C. perversum** L. Three live examples amongst some *C. tubercularis*; also occurs alive at lowest water mark.

Cerithiopsis tubercularis Mont. Alive under and on stones, which are sometimes covered with a yellow decaying-looking alga, on which, perhaps, they feed; amongst rocks at low water mark on spring tides. The shells were adult and young, and occurred numerous in 1888 and 1889, mostly of a dwarf form, though finer shells were obtained from one locality.

Purpura lapillus L. Common.

Buccinum undatum L. Dredged for food off the harbour mouth.

Murex erinaceus L. Comparatively small live specimens locally amongst the rocks.

Trophon muricatus Mont. Two specimens trawled in good preservation. It is a scarce species in this bay.

Fusus gracilis DaC. Trawled occasionally, but only dead shells.

F. jeffreysianus Fisch. One dead specimen trawled.

Nassa reticulata L. Trawled and dredged alive; common.

N. incrassata Ström. Trawled and dredged alive.

Defrancia gracilis Mont. Three adult examples dredged and trawled; dead specimens occasionally.

D. linearis Mont. One trawled alive, somewhat unique in its sculpture and colouring.

D. purpurea Mont. Two examples dredged alive, and two found in good condition in 1886 in drift in the harbour.

Pleurotoma striolata Phil. Some specimens dredged alive and fresh in mud, but of small size.

P. attenuata Mont. Dredged and trawled—live, dead, and fresh examples, but comparatively small.

P. costata Donovan. Dredged and trawled in various states in mud.

P. brachystoma Phil. Live and dead examples dredged and trawled in mud, some being very fine.

- P. nebula** Mont. Dredged and trawled alive and dead in the mud, but mostly belonging to a dwarf form. A great many of this species and *P. brachystoma* are eroded on the upper whorls, even when the animals were in them.
- P. lævigata** Phil. Only imperfect and dead shells in drift and on the beach.
- P. lævigata** v. *minor* Jeff. Several examples dredged alive.
- P. septangularis** Mont. One beautiful specimen trawled alive, also a few dead examples.
- P. rufa** Mont. Occasional dead specimens.
- Cypræa europea** Mont. A few hanging by their byssus on the rocks at low tides, and young shells in weeds. Occurs dead in large numbers on the beach.
- Ovula patula** Penn. An imperfect specimen on the beach.
- Cylichna umbilicata** Mont. Dead shells sparingly in drift.
- C. cylindracea** Penn. Trawled and dredged fresh and dead, also from the beach.
- Utriculus truncatulus** Brug. Dead specimens from weeds and drift.
- Actæon tornatilis** L. Small dead specimens on the beach.
- Bulla hydatis** L. One lot of seventeen and another of three trawled, all perfect, and from which the animals were extracted, but the fragility of the outer lip does not render this an easy process. Some young specimens were stranded alive with *L. perspicua*, *P. aperta*, and young *L. elliptica*. Dead shells have been obtained from time to time.
- Scaphander lignarius** L. Five fine examples obtained only by trawling, from which the animals were extracted by placing them in boiling water, when the bodies fell out on being touched. The shields of the gizzard were extracted, of which there are three. The colour of the shell was dark chestnut brown.
- Philine punctata** Clark. A few alive from the rocks.
- P. aperta** L. Occurs in large numbers in the mud of the bay.

Pleurobranchus membranaceus Mont. I propose to furnish, in a separate paper, notes and observations upon this species, which occurred in such large numbers in the years 1887, 1888, and 1889.

Aplysia punctata Cuvier. These animals were found most abundantly on our Eastern rocks in the spring of 1887. The shields of 146 were obtained in a single day, the easiest method being scalding prior to using a sharp pen-knife. The migration for deposit of ova has since been very unfrequent and animals scarce. Only two sea hares have been obtained from the sea itself by trawling. They look remarkably well in a small aquarium, with their strange contortions and change of colour according to movements and light.

Tritonia hombergi Cuv. A few of these animals, adults, trawled on one particular course in the bay, over a period of three years and on three occasions, the last from amongst a portion of a large shoal of *P. membranaceus*. The heads of all were cut off, and their horny jaws have been preserved in various ways. The secretions of these slugs, when handled, blistered the thumb and fingers. The juices of the animal are as clear as water.

Doris tuberculata Cuv. Two specimens trawled in 1889. It occurs under rocky ledges in the bay.

Melampus bidentatus Mont. Alive under stones and rocks.

M. myosotis Drap. Adults cast up dead on the shore.

Otina otis Turt. Live examples from clefts in the rocks.



Valvata piscinalis var. albina at Lewes, Sussex.—

I enclose six specimens of this for the Society's Cabinet, which were taken at Lewes last year.—C. H. MORRIS, Lewes, Sussex, 8th February, 1893. (Read before the Conchological Society, 12th April, 1893).

EIGG SHELLS:

ADDITIONAL NOTES ON THE LAND & FRESHWATER MOLLUSCA
OF THE ISLAND OF EIGG.

BY THE REV. JOHN McMURTRIE, D.D.

*The List is authenticated by specimens, which are herewith presented
to the Museum of the Conchological Society at Leeds.*

(Read before the Conchological Society, April 12, 1893).

SINCE the paper was written which appeared in the 'Journal of Conchology' for October, 1892. (vol. vii., pp. 113—119), the writer has paid two visits to Eigg, in the summers of 1891 and 1892, and is now able to extend the List, adding ten species and two or three varieties to the record for the island.

Those which are new are marked with an asterisk (*).

***Pisidium fontinale** Drap. A ditch in which the water does not dry up at Nead-na-Feannaig. Small stream at Houlin in the interior of the island.

***Pisidium pusillum** Gmel. A few in small, not very wet, open grassy drain in lawn at Nead-na-Feannaig, living with *Hyalinia*, *Vertigo*, *Carychium*, etc.

Limnæa peregra var. *lineata* Bean. Ditch, or small stream, not drying up, at Nead-na-Feannaig. It seems to have some of the characters of var. *ovata*.

***Limnæa peregra** var. A small form (none larger than those sent), abundant in pools close to the sea, near the 'Singing Sands,' west side of the island. It is less solid than var. *maritima*—seems near var. *boissyi*.

Limnæa peregra Mull. Small form, abundant in stream at Houlin, one mile from the sea.

Limnæa peregra Müll. Small form, in a rill running over steep rocks near the sea at the 'Singing Sands.' It is less inflated than the variety in the pools.

Limnæa peregra Müll. A small form in Kildonan Burn at Kiel, east side of Eigg.

- **Limnæa truncatula* Müll. Rill near 'Singing Sands'; pool on shore at ditto; stream at Houlin. A few found at each place.
- Ancylus fluviatilis* Müll. Plentiful in Kildonan Burn.
- **Vitrina pellucida* Müll. A few in open grassy drain in lawn at Nead-na-Feannaig. A few at Lag, on west side of island.
- Hyalinia cellaria* Müll. Many specimens near 'Singing Sands.'
- Hyalinia nitidula* Drap. Open mossy drain in lawn at Nead-na-Feannaig.
- **Hyalinia pura* Alder. Very few in open grassy drain at Nead-na-Feannaig. Two specimens sent.
- **Helix hortensis* var. *minor* Moq. Two specimens near sea at south end of Eigg.
- **Helix rotundata* Müll. A few at south end of Eigg. Approaching var. *pyramidalis*.
- **Helix pygmæa* Drap. Five specimens found (two presented) in open grassy drain in lawn at Nead-na-Feannaig.
- **Helix pulchella* Müll. Two specimens found (and presented) both of usual type—a living shell at foot of glebe, east side of island, and a dead shell at Nead-na-Feannaig.
- **Vertigo substriata* Jeff. Ten specimens (three presented) in open grassy drains in lawn at Nead-na-Feannaig.
- **Vertigo edentula* Drap. Somewhat plentiful at Nead-na-Feannaig, both in the grassy drains and on stones higher up.
- **Carychium minimum* Müll. Very many in open grassy drains in lawn at Nead-na-Feannaig.

Most of those formerly recorded were found again.

Helix nemoralis L. Of the normal size at the 'Singing Sands.'

Helix arbustorum var. *flavescens* Moq. A fine specimen, full-sized, thin, and transparent, was taken at the foot of the glebe.

Helix arbustorum var. *fusca* Fér. Three young specimens were taken at the south end, near the sea.

Helix granulata Alder. Abundant under stones at the 'Singing Sands.'

Clausilia perversa Pult. Also abundant there.

Helix itala L. Found plentifully as before ; also its varieties *instabilis* Ziegl., *leucozona* Moq., and *alba* Charp.

Pupa anglica Fér. Again found above Nead-na-Feannaig.

Cochlicopa lubrica Müll. Abundant in the open grassy drains at Nead-na-Feannaig ; the var. *lubricoides* is much rarer.



ALBINO VARIETIES AT LEWES, SUSSEX.

By C. H. MORRIS.

(Read before the Conchological Society, April 12, 1893).

It may be of interest to record that I took three examples of *Planorbis spirorbis* var. *albida* at Lewes last year. I have also discovered *Planorbis corneus* var. *albina* at Lewes. Neither of these varieties I think have ever been recorded from Sussex. We seem particularly well off for *albino* forms at Lewes.

The following is a list of those that occur :—

Valvata piscinalis var. *albina*.

Planorbis spirorbis var. *albida*.

P. corneus var. *albina*.

P. contortus var. *albida*.

Limnæa palustris var. *albida*.

Hyalinia cellaria var. *albina*.

H. nitidula var. *helmii*.

H. pura var. *margaritacea*.

H. aspersa var. *exalbida*.

H. nemoralis var. *albina*.

H. cantiana var. *albida*.

H. cartusiana var. *lactescens*.

H. rufescens var. *alba*.

H. virgata vars. *alba* and *albicans*.

H. caperata var. *alba*.

H. rotundata var. *alba*.

Clausilia laminata var. *albina*.

Azeca tridens var. *crystallina*.

ARION OCCIDENTALIS:
AN APPARENTLY NEW SPECIES.

By T. D. A. COCKERELL, F.Z.S.

(Read before the Conchological Society, Dec. 7, 1892).

IN October, 1890, the Rev. J. W. Horsley kindly gave me a living *Arion*, which he had found at Jurancon, near Pau, Basses Pyrenees, under stones. Ever since, I have had the description by me, hesitating to propose a new species of French *Arion*; but as I am still unable to satisfactorily place the slug with anything described, I venture at last to submit an account of it.

***Arion occidentalis* n. sp.**

Length about 25 mill., mantle about 11 mill. long. Respiratory orifice not very much anterior. Tentacles small, black. Head black. Mantle wrinkled in contraction. Rugæ of body ill-defined, not very numerous, large, elongate. Neck black, with four impressed lines, joined by more obscure transverse ones. Tentacles granulose. Mantle subrugose, much thrown into folds. Ground colour of body and mantle pale reddish-ochre, browner on back. Back of mantle and body with numerous small black spots. Subdorsal area pale, and then black lateral bands, strong and broad on body, less developed on mantle, going over, not enclosing, the respiratory orifice. Sides of mantle peppered with black. Body below lateral bands gradually becoming grey. Edge of foot pale ochre, with some minute grey specks, but no transverse lineoles. Sole yellowish, median area slightly greyish. Slime whitish or very pale yellow, not opaque; that exuding from the caudal pore is apparently yellow. (Description from a living specimen).

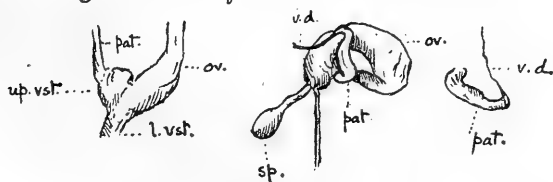
Genitalia somewhat peculiar. The patronenstrecke is moderately stout, and strongly curved at its end, the curved portion gradually tapering into the vas deferens. The spermatheca is oval, of fair size, with a duct about as long as itself. A long muscle arises close to the proximal end of the duct, but not from it. The lower portion of the oviduct is distinctly swollen, the swelling being fusiform in shape. There is a distinct upper vestibule, which is larger than the lower. The hermaphrodite gland is dark and imbedded in the liver, its duct is yellowish white, and its proximal half is repeatedly curved. The spermatheca is pinkish.

The specimen described is now in the British Museum. Mr. Horsley wrote that he thought the species was not rare in the original locality. The only other *Arion* he found in the neighbourhood was *A. empiricorum* at Pau. He sent me a fine example of the bright red var. *lamarckii* Kal., and wrote that the species was 'very common and large—always the same colour except, I think, a few brown.' *Limax marginatus* (form *typus* L. & P.) was common on trees at Pau and three were sent.

At one time I thought that *A. occidentalis* might be a variety of *A. alpinus* Poll., but Mr. Pollonera kindly sent me specimens of that species, which is really quite different.* In many respects the new species is like *A. hortensis*, but I feel sure it is not a variety of that; nor does it agree with any of the *subfuscus* group. Now that it is described, perhaps further specimens will be found, and the validity of the species confirmed, or otherwise, by other observers.

Institute of Jamaica, Kingston, Jamaica, Nov. 13, 1892.

genitalia of Arion occidentalis.



Banding on mantle.

A. occidentalis.



A. alpinus.



[To ensure complete accuracy, we reproduce in fac-simile the author's original pen-and-ink drawings.—EDS.]

* *A. alpinus* may be recognised more especially by the strong outward flexure of the bands on the mantle, posterior to the respiratory orifice. In *occidentalis* they are nearly straight.

Vertigo pusilla var. **albina**.—Shell translucent white.—Through the kindness of Mr. R. Standen, of Owens College, Manchester, I have been favoured with a very beautiful and perfect example of this interesting variety, one of several he has been so fortunate as to find. It is, I believe, new to science, and as yet unrecorded and unnamed, and is a welcome addition to the British list. The specimen in my possession is in all respects, except colour, identical with the typical form, possessing the size, shape, number and arrangement of teeth as is usual in the species. This variety was found by Mr. Standen associated with typical *V. pusilla*, *V. angustior*, and other uncommon species amongst rejectamenta at Portsalon, near Letterkenny, in Donegal County, at the latter end of May of the present year.—J. W. TAYLOR, June 20th, 1893.



On a variety of Cypræa cruenta Gmel.—In my survey of the genus *Cypræa*, 1888,* a very striking variety was differentiated under the name of *C. cruenta* Gmelin var. *coloba* (κόλοβος Curtus). This form is always, so far as my experience goes, very highly coloured, the base especially being bright salmon pink, the lowest anterior tooth highly developed and somewhat projecting, the shape more rounded than the type, and the whole shell dwarfed in comparison with the normal *cruenta*. Mr. Ford has, in the Feb. number of the 'Nautilus,'† this year (1893), given a very succinct and accurate description of this variety; but, having overlooked the remarks in the 'Survey' above referred to, has re-christened the variety as var. *gregori* of *C. cruenta*, the name *coloba* having priority of five years. A figure is given of this form, both in the 'Survey' and in the 'Nautilus' (vol. vi., pl. ii.), and also in Sowerby Thes. Conch.‡—JAMES COSMO MELVILL.

* Mem. & Proc. Manch. L. & P. Soc., 1888 (iv. series, vol. i., p. 218.

† 'Nautilus,' vol. vi., p. 112, 1893.

‡ Sow. Thes. Conch. *Cypræa*, pl. xxiii., f. 190, as *caurica* var.

LAND AND FRESHWATER MOLLUSCA COLLECTED
AROUND PORTSALON, CO. DONEGAL,
IRELAND.

By R. STANDEN.

(Read before the Manchester Branch, June 8th, 1893).

THIS is a record of the results of four days collecting in the neighbourhood of Portsalon, on the 28th to the 31st of May, 1893, and is chiefly interesting on account of its including several important additions to the 'List of Irish Land and Freshwater Mollusca,' by Dr. R. F. Scharff, published in the 'Irish Naturalist' for 1892. Species not recorded for Co. Donegal in that list are marked on this with an asterisk (*).

Portsalon is a retired little bay on the west side of Lough Swilly, and about ten miles from Rathmullen. There is a good hotel, and an expanse of low-lying sand-hills at the head of the bay has been laid out as golf-links.

The whole district under examination was metamorphic-quartzite rock, with occasional masses of intrusive igneous rock, peculiarly anti-conchological. A limestone cliff, abutting on the sandy waste near to the so-called 'Bottom Shore' at the west end of Kinny Lough, is marked on the map as an isolated mass of metamorphic-limestone. This proved to be the most prolific hunting-ground for Helicidæ that occurred.

The extreme dryness of the weather prior to my visit must have influenced the comparative scarcity of some species, and particularly so of the freshwater ones, of which several were only found in a half-grown state. The smaller pools and road-side ditches were dried up; but a good many specimens were obtained from such places by examining the surface of the mud and turning over the weeds in the damper parts. Rain fell more or less each day, which brought out numbers of slugs and the larger Helices, and search in the early morning and late in the evening proved very productive. But the best hauls were

made from some rejectamenta on the golf-links, not far from the banks of a small river running through the sand-hills near Port-salon. Large quantities of shells had been accumulated, including several purely woodland species, and then blown along by the wind and lodged in a sheltered hollow; and this deposit, dried and sieved, and then carefully sorted over, yielded many valuable shells, notably *Vertigos* and *Acme lineata*. For the most part the shells are in remarkably good condition and quite as fresh-looking as living specimens.

The way in which these collections of shells are formed in the hollows of the sand-hills was not a little puzzling at first; but, being out one morning when a brisk wind was blowing, I had the whole process satisfactorily demonstrated. Little streams of shells, large and small, from the debris left high up on the banks of the river by past floods, or from the surface of the sand-hills generally, were trickling along through the scanty herbage in a most extraordinary fashion, winding in and out amongst the grass stems, uphill and down, until they were finally precipitated into a deep hollow sheltered from the wind. With the shells I often noticed weevils and other beetles being borne along by the force of the wind.

The following is a list of species collected. For convenience of reference I have used the classification adopted by Dr. Scharff in his list:—

- **Vitrina pellucida* Müller.—Occurs on the golf-links, Port-salon, at Kinny Lough, and in the old burial-ground at Fahan, where some very large specimens were taken.
- **Hyalinia cellaria* Müller.—Common everywhere, and especially abundant in burial-ground at Fahan.
- **H. draparnaldi* Beck.—A few fine examples at Port-salon and Fahan.
- **H. alliaria* Miller.—Fairly common under stones at Port-salon and Kinny Lough.

- ***H. nitidula** Drap.—Under stones on road-sides, Portsalon, and in the burial-ground, Fahan. I took along with the type three very pretty specimens of the pearl-white variety, *Helmii* Alder, alive.
- ***H. pura** Alder.—Not uncommon about Portsalon, and principally the whitish form (type), but the brown variety also occurs sparingly.
- H. radiatula** Alder.—A few under moss-covered stones in company with *Vertigo edentula* on road-side near Portsalon. All taken were of the greenish-white variety *viridescenti-alba* Jeff.
- ***H. crystallina** Müller.—Not uncommon at Portsalon. A small compact form which may prove to be the variety *contracta* Westerlund.
- ***H. fulva** Müller.—Under stones at Portsalon, and on road to the Seven Arches; on moss-covered logs at Kinny Lough, and dead amongst the golf-links rejectamenta.
- Arion ater** L.—Very abundant, together with var. *brunnea* Rbk., especially at Portsalon, where I counted over forty specimens on one rubbish-heap near the hotel. I had a curious experience with a large specimen which I picked up at the Seven Arches, and carried in my hand for a long time, enclosed in a dock leaf. A rasping sensation in the palm of my hand revealed the fact that the Arion's jaws were at work on my cuticle, and I allowed it to gnaw away until it was so near through that the operation became too painful to bear. Examination of the spot with the lens showed the skin almost rasped away, and the place remained tender and sore, like a slight burn, for several days.
- A. subfuscus** Drap.—Several specimens at Portsalon and Kinny Lough.
- A. hortensis** Fér.—Not uncommon in a wood at Portsalon, and in the burial-ground at Fahan.

- A. circumscriptus** Johnst.—Common at Portsalon and Kinny Lough. Readily distinguished from *A. hortensis* by its white foot.
- Limax maximus** L.—Solitary specimens on moss-covered tree stumps at Portsalon. The largest specimen found, when fully extended, measured 126 millimeters, and was a great beauty.
- L. marginatus** Müller.—Extremely abundant in all stages of growth in tufts of moss (*Orthotrichum phyllanthemum*) on the trees in a plantation behind the hotel, Portsalon.
- Agriolimax agrestis** L.—Very abundant and exhibiting much variation in colour.
- A. lævis** Müller.—Occurs at Portsalon, Kinny Lough, and Fahan. Only three found, and those all under decayed wood in damp places.
- Amalia sowerbyi** Fér.—One specimen under a stone at Kinny Lough.
- Helix pygmæa** Drap.—Not uncommon amongst moss at Portsalon and Kinny Lough.
- Helix rotundata** Müller.—Strangely enough this common shell was found only at Kinny Lough, where it was very plentiful and prettily marked.
- ***H. pulchella** Müller.—Extremely common in the golf-links rejectamenta at Portsalon. The ribbed variety is absent. It is rather remarkable that although I have collected the species in numerous localities I have never yet taken type and variety *costata* in company!
- ***H. aculeata** Müller.—Amongst moss-shakings, Kinny Lough, rare.
- H. hispida** L.—Very common under stones and amongst nettles at Portsalon, Kinny Lough, and in Fahan burial-ground, along with variety *concinna* Jeff.
- H. rufescens** Penn.—Kinny Lough. Not at all common, but showing great contrasts of colour.

- ***H. arbustorum** L.—One specimen only amongst golf-links rejectamenta, Portsalon. Probably brought down by the stream running through the sand-hills from woods higher up the valley. The shell found is adult-type, and keen search was made for additional specimens, without success; but I have no doubt careful search in the neighbouring woods would reveal its habitat.
- H. ericetorum** Müller.—Very abundant everywhere on the sand-hills, also on many of the road-side fence-backings, and showing much variation; but the prevalent form is a remarkably dark one, which Dr. Westerlund has referred to a new species, *H. lampra*. Though British conchologists still prefer to consider this form as merely a variety of the typical *H. ericetorum*, it certainly is quite as worthy of specific recognition as many of the continental ‘species.’
- H. acuta** Müller.—Very common everywhere on the dunes, but does not exhibit the variation met with in many other places, the variety *strigata* Menke being the only one noticed, and the shells are mostly young at this season.
- H. nemoralis** Müller.—Occurs at Portsalon, Kinny Lough, and ‘Bottom Shore’ Bay, but not at all commonly, alive. The wind-blown shells on the dunes are not so numerous as one might expect. Most of the living shells are remarkably beautiful in colour, and strikingly marked, principally with interrupted bands. Specimens were observed high up on the trunks of beeches on the roadside near Rathmullen.
- H. hortensis** Müller.—Much more plentiful at Portsalon than *H. nemoralis*, but only found in two places—one, a stunted hedgerow, and the other at the base of a steep cliff just above high-water mark amongst some bramble bushes. The bandless yellow form predominates, but richly-colored banded shells occur, together with very pretty variety *arenicola* Macgill. This species is down for Donegal with a query in Dr. Scharff’s list, but at Portsalon it must be said to occur frequently.

- H. aspersa** Müller.—Very common and full-sized everywhere on old walls and bare slopes facing the sea. Those sheltered by walls are richly but uniformly marked, whilst those exposed in the open are quite destitute of epidermis, and look dead and weathered, but were quite lively and pairing freely. It extends quite down to the sea-shore, indeed I found numbers feeding on a heap of decaying sea-weeds piled up at the foot of a cliff. I also noticed many shells on the sands, still damp from the outgoing tide, which had evidently been blown off an overhanging cliff during the night, and it was interesting to observe the unerring instinct with which each animal was making all speed for the base of the cliff, which many had already reached and were scaling, their tracks in the sand plainly showing the distance travelled.
- ***Cochlicopa lubrica** Müller.—Common everywhere together with its varieties *ovata*, *lubricoides*, and *hyalina*.
- Pupa anglica** Fér.—Several nice white-lipped specimens in the golf-links rejectamenta, Portsalon.
- P. cylindracea** DaCosta.—Generally distributed, but required careful search, and I only found it singly here and there, chiefly under the uppermost stones of old moss-covered walls. Two forms occur, one unusually long, the other short and stumpy.
- ***P. muscorum** L.—Fairly plentiful in rejectamenta (dead), and alive under stones on the shore just above high-water mark at Portsalon; very large living specimens under stones at Kinny Lough. Several pure-white translucent fresh shells (var. *albina* Menke) from the Portsalon rejectamenta.
- ***Vertigo antivertigo** Drap.—Not uncommon in the golf-links rejectamenta, Portsalon. Very fresh and beautiful specimens.
- ***V. edentula** Drap. — Pretty common on dead bramble twigs, and the moss-covered stones below them, on road-side near Portsalon. The specimens on the brambles were

each curiously located at the base of a prickle, and dropped at the slightest touch in a most provoking fashion, causing me to lose many.

- ***V. alpestris** Alder.—In the golf-links rejectamenta. Rare, but extremely clean, fresh, and beautiful.
- ***V. pygmæa** Drap.—Dead amongst the golf-links rejectamenta, Portsalon; and alive amongst moss at 'Bottom Shore' Bay, very dark-looking specimens, but not at all common in either locality.
- ***V. substriata** Jeff.—Much more plentiful than the last species, in rejectamenta and moss-shakings, Portsalon. All dead, but many quite fresh and in good condition.
- ***V. pusilla** Müller.—Not uncommon in the Portsalon rejectamenta. The shells are quite fresh, and totally unlike any I have seen from elsewhere, being remarkably thin in texture, and of a delicate translucent whitish colour.
- V. angustior** Jeff.—By far the commonest of the *Vertigos* found amongst the golf-links rejectamenta, Portsalon. Nearly all the shells are beautifully fresh and perfect, the animals in many cases being apparently only recently dead. I feel confident that 'sweeping' the long grass on the banks of the river with a net during wet weather would result in the capture of this species alive in plenty. There must be myriads in this locality, judging from the large number I took of quite fresh shells.
- Balea perversa** L.—Extremely plentiful in tufts of *Orthotrichum phyllanthemum* high up on the trees in the wood behind the hotel, Portsalon.
- Clausilia rugosa** Drap.—Sparingly amongst the rejectamenta at Portsalon, and very common under moss-covered stones at Kinny Lough. Mostly a short stumpy form approaching variety *tumidula* Jeff.
- ***Succinea elegans** Risso.—Plentiful on the margin of water-holes on golf-links, Portsalon. A richly-coloured form of variety *ochracea* Betta.

- Carychium minimum** Müller.—Common alive under turf and cow-dung on margin of water-holes on golf-links, and dead amongst rejectamenta, Portsalon; under stones at Kinny Lough, Shannagh Lough, and in burial-ground, Fahan. Mostly a very short tumid form.
- Limnæa peregra** Müller.—Occurs in all the road-side ditches and freshwater loughs. In Shannagh Lough a beautifully clean and delicate form abounds, some of the specimens being quite white.
- L. palustris** Müller.—In water-holes on golf-links, Portsalon, and in Ballymagahy Lough. Not at all common. Some specimens are decollate, and others are variety *roseolabiata* Jeff. with a very deep rich red interior of lip.
- L. truncatula** Müller.—A few on mud of a dried-up ditch near Portsalon.
- ***Physa fontinalis** L.—A few young specimens taken in Ballymagahy Lough, where I have no doubt it will be plentiful enough later in the season, as mine were taken from one dip of the dredge amongst some long grass.
- ***P. hypnorum** L.—The Rev. A. H. Delap has sent specimens of this species which he took in Reenbuoi Lough.
- Planorbis umbilicatus** Müller.—Alive in water-holes on golf-links, Portsalon, and dead on shore of Shannagh Lough.
- ***P. spirorbis** L.—Not uncommon but very small in Shannagh and Ballymagahy Loughs.
- P. contortus** L.—Small, compact, clean specimens in limited numbers were taken in Ballymagahy Lough on alga.
- P. albus** Müller.—Plentiful in both Shannagh and Ballymagahy Loughs.
- P. glaber** Jeff.—A few nice specimens taken in Ballymagahy Lough on alga.
- ***P. nautilus** L.—Ballymagahy Lough. All belonged to the v. *crista* L.
- P. fontanus** Lightfoot.—A number of dead specimens on shore of Shannagh Lough.

Acme lineata Drap.—Dead but quite fresh specimens amongst rejectamenta, Portsalon.

Valvata piscinalis Müller.—Common, but very young in both Ballymagahy and Shannagh Loughs. Some very large dead shells on mud of dried-up ditch, Portsalon.

V. cristata Müller.—I took some very fine specimens of this in Ballymagahy Lough. The species is down for Donegal with a query in Dr. Scharff's list.

***Sphærium corneum** L.—Some small specimens in water-holes on golf-links, Portsalon, and I found it dead in several dried-up ditches in the neighbourhood.

Pisidium fontinale Drap.—Not uncommon in water-holes on the golf-links, and ditches, Portsalon.

***P. roseum** Jeff.—Very common in a fine gravel-bed on the west side of Ballymagahy Lough.

***P. pusillum** Gmel.—Common in water-holes on golf-links and in several ditches near Portsalon, also in Ballymagahy Lough on sandy mud.

NOTE.—By way of showing the richness of the rejectamenta, and the relative proportion of species, I add a list of shells taken out of one tablespoonful of the wind deposit, though to prevent misconception the reader must understand that the spoonful from which the above were taken, represents the result of a careful sieving of at least a pint of the deposit as collected ; all sand, and everything above the size of *Cochlicopa*, being removed by the process :—

3 <i>Vertigo pusilla</i> ,	5 <i>P. cylindracea</i> ,
79 <i>V. angustior</i> ,	3 <i>P. anglica</i> ,
21 <i>V. pygmaea</i> ,	142 <i>Helix pulchella</i> ,
47 <i>V. substriata</i> ,	98 <i>Cochlicopa lubrica</i> ,
3 <i>V. alpestris</i> ,	4 <i>Acme lineata</i> ,
8 <i>V. edentula</i> ,	9 <i>Hyalinia crystallina</i> .
5 <i>V. antivertigo</i> ,	19 <i>Carychium minimum</i> .
30 <i>Pupa muscorum</i> ,	

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

PROCEEDINGS.

211TH MEETING, WEDNESDAY, APRIL 12th, 1893.

Held in the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the chair.

Library Purchases announced :

Férussac : Hist Nat. Gen. Partic. des Moll., 1819, etc., 2 vols., folio.

Millet : Mollusques de Maine-et-Loire, first edition, 1813, and third edition, 1854.

A. Moquin-Tandon : (1) Observations sur les Machoires des Hélices de la France, Toulouse, 1848-51 ; (2) Observations sur les Vesicules Multifides des Hélices de la France ; (3) Mémoire sur l'Organe de l'Odorat chez les Gastéropodes terrestres et fluviatiles, 1851 ; (4) Observations sur le Sang des Planorbes, 1851.

Brard : Histoire des Coquilles terrestres et fluviatiles qui vivent aux environs de Paris, 1815.

C. A. Westerlund : Fauna der in der Palearctischen Region lebenden Binnenconchylien, VII., Malacozoa Acephala, 1890.

Dr. Miller : Die Schalthiere des Bodensee's, 1873.

Donations to the Library announced and thanks voted. From the respective Editors : L'Echange Revue Linneenne, Dec., 1892, Jan. and Feb., 1893 ; British Naturalist, Nov. and Dec., 1892, Jan. and Feb., 1893 ; The Naturalist, April, 1893 ; Feuille des Jeunes Naturalistes, Mars et Avril, 1893 ; Catalogue de la Bibliothèque, fasc. 16, Fév. 1893.

From the Trustees of the Australian Museum : Records, vol. ii., No. 4, Feb., 1893 ; and Ogilby's Catalogue of Australian Mammals, 1892.

From the Trustees of the British Museum : F. Jeffrey Bell's Catalogue of British Echinoderms, 1892.

From the Society : Transactions of the Royal Society of South Australia, vol. xv., part 2, and vol. xvi., part 1 (Dec., 1892).

From the respective Authors : D. J. Adcock's Hand List of the Aquatic Mollusca inhabiting South Australia, 1893 ; J. Cosmo Melvill and A. Abercromby's Marine Mollusca of Bombay, 1893 ; J. C. Melvill's Descriptions of 25 New Species of Marine Shells from Bombay, 1893 ; and Fauna des Grossen Plöner See's, 1892.

Donations to Collections announced and thanks voted :

From Mr. G. Trevor Lyle : *Helix pomatia*, one from the Downs near Devizes, Wilts. North.

From Rev. J. McMurtrie : Series of examples of *Pisidium fontinale*, *P. pusillum*, *Limnaea peregra* and varieties, *L. truncatula*, *Ancylus fluviatilis*, *Vitrina*, *Hyalinia cellaria*, *H. nitidula*, *H. pura*, *Helix hortensis*, *H.*

rotundata, *H. pygmaea*, *H. pulchella*, *Vertigo substriata*, *V. edentula*, and *Carychium*, from the Island of Eigg, Ebudes North, in illustration of his paper.

From Mr. C. H. Morris : *Valvata piscinalis* var. *albina* from Lewes, in illustration of his paper.

From Mr. Lionel E. Adams, B.A. : *Azeca tridens* from Yardley Chace, Northants., 18th March, 1893.

Papers Read :

A paper by Rev. John McMurtrie, D.D., M.A., entitled 'Eigg Shells : Additional Notes on the Land and Freshwater Mollusca of the Island of Eigg,' was read, and illustrated by a full suite of specimens presented to the Society's collection [paper printed in 'J. of C.,' April, 1893, pp. 189—191].

Two short notes by Mr. C. H. Morris were also read, the first on '*Valvata piscinalis* var. *albina* at Lewes, Sussex,' and the second upon 'Albino varieties at Lewes, Sussex' [printed in 'J. of C.,' April, 1893, pp. 188 and 191].

Exhibit :

On behalf of Mr. Charles Oldham were shown *Sphærium rivicola* and *Dreissensia polymorpha* from Selly Oak, Worcestershire.

212th MEETING, WEDNESDAY, MAY 3rd, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the chair.

Donations to Library announced and thanks voted : From the respective Editors : *Feuille des Jeunes Naturalistes*, Mai, 1893 ; *The Naturalist*, May, 1893 ; and *the British Naturalist*, May, 1893.

From the respective Authors : W. Denison Roebuck, *The Specific Rank of Limax cinereo-niger*, 1893 ; F. W. Wotton, *The Life History of Arion ater* and its Power of Self-fertilization, 1893.

Donation to Photograph Album announced and thanks voted :

From Mr. Wm. Moss : 5 photographs of the genital organs of *Manx Bulimix acutus* ; 1 each of lingual ribbons of *Cyclostoma elegans* (Clifton, Bristol), *Testacella haliotideae*, *Hyalinia alliaria* (Lancashire), *H. nitidula* (Park Bridge, near Ashton-under-Lyne), *Limnea auricularia* (Bardsley, near Ashton-under-Lyne), *Helix pomatia* (Caterham, Surrey), *Orthalicus zebra* (Trinidad), and *Helicina dysonii* (Trinidad) ; 1 of the darts of *Helix pomatia* (France) ; and 1 each of the shells of *Opisthotoma pulchella* E. Smith (North Borneo), and *Ennea (Diaphora) quadrasi* Möll. ff. (Ceba) ; —16 photographs.

Donations to the Collections announced and thanks voted :

From Mr. John W. Taylor, F.L.S. : A large number of Land, Fresh-water, and Marine Shells, British and Foreign.

From Mr. Charles Oldham : *Sphærium rivicola* and *Dreissensia polymorpha*, Selly Oak, Worcestershire.

Candidates Proposed for Membership :

Mr. Philip James Rufford (proposed by Messrs. A. G. Alletsee and Robert Cairns), and Mr. Henry Crowther, F.R.M.S. (by Messrs. John W. Taylor, F.L.S., and William Nelson).

Paper Read :

A note by Dr. Heinrich Simroth, an honorary life member of the Society, entitled 'Some Remarks with respect to Mr. Wotton's Paper on the Life History of *Arion ater*,' was read [and is printed in the present number, p. 208].

Exhibits :

On behalf of Mr. J. A. Hargreaves were shown some examples, much decollated, of *Limnæa glabra*, from Scarborough.

On behalf of Mr. J. Madison were exhibited specimens of the same species from Hall Green, near Birmingham.

On behalf of Mr. F. W. Fierke : Examples of *Helix hortensis* var. *castanea* 00300, from Cottingham Road, Hull ; *H. nemoralis* vars. *libellula* 12345 *hyalozonata* and *libellula* 00300 *hyalozonata*, from Burstwick, near Hull ; *Vertigo edentula* and *V. pygmæa* from Speeton Cliffs, and of the last named from Drewton Vale, all in South-East Yorkshire.

The Recorder showed a large number of Scottish shells sent by Mr. W. Evans, F.R.S.E., for authentication, including *Vertigo edentula* from Cromdale, near Grantoun, co. Elgin ; *Carychium*, *Hyalinia glabra*, *H. fulva*, *H. pura* var. *margaritacea*, and *Helix pygmæa* from the banks of the Avon above Ballindalloch, Banffshire, *H. radiatula* from Ballindalloch, Banffshire, and *Helix pygmæa* from Ballindalloch Castle, Elginshire, all of which are new county records, none of them having been before submitted to the Society's referees from the respective counties.

213th MEETING, WEDNESDAY, MAY 31st, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the chair.

Donations to the Library announced and thanks voted : From the respective Editors : The Naturalist and British Naturalist for June, 1893.

From the Manchester Museum : Museum Handbooks : Catalogue of the Type Fossils, by Herbert Bolton, 1893 ; and Outline Classification of the Animal Kingdom, second edition, 1892.

From the respective Societies : Journal and Proceedings of Royal Society of New South Wales, vol. xxvi., 1892 ; List of Exchanges of same, 31st Dec., 1892 ; Abstract Proceedings of Linnean Society of New South Wales, 29th March, 1893 ; and Transactions of Yorkshire Naturalists' Union, part 18, 1893.

Donations to Collections announced and thanks voted :

From Mr. W. Howard : Six-banded and other examples of *Helix nemoralis* from Adel, near Leeds.

From Mr. H. Turner : Various band-formulæ of *Helix nemoralis*, from near the Cemetery, Horsforth, near Leeds.

From Mr. Hugh Richardson : Various shells from Greece, including *Helix vermiculata* and *Stenogyra decollata* from Athens ; various fossils from Kalanata ; shells from Langada Gorge, near Sparta ; and a slab of shell-conglomerate from Olympia, containing many specimens of a small *Planorbis*.

From Mr. W. Thomson : A valuable and extensive series of pleistocene fossil shells from the Copford deposit, Essex, including *Vertigo pusilla*, *Helix lamellata*, *H. aculeata*, *H. pygmæa*, and numerous other species.

New Members Elected :

Mr. Henry Crowther, F.R.M.S., Curator, The Museum, Leeds.

Mr. Philip James Rufford, 1, Gloucester Place, The Croft, Hastings.

The election (or rather re-election) of Mr. Crowther after a prolonged absence from Leeds and his recent return to the city as Curator of the Museum there, is of interest, inasmuch as he was one of the four conchologists by whom the Conchological Society was first founded in Leeds in 1876.

Exhibits :

On behalf of Mr. R. Wigglesworth were shown *Sphærium corneum* and *Limnæa peregra*, exhibiting features of interest, from Clayton-le-Moors, near Accrington.

On behalf of Mr. F. W. Wotton were exhibited a few examples of *Planorbis spirorbis* from Bute.

Mr. John W. Taylor, F.L.S., brought slides of the radulæ of *Arion hortensis* and *A. circumscriptus*, *Hyalinia cellaria* and *H. draparnaldi*, *H. radiatula* and *H. electrina*, *Succinea elegans* and *S. ovalis*, *Buliminus obscurus* and *B. montanus*, *Helix hispida* (= *concinna*) and var. *hispidosa*, for comparison. They were shown under the microscope by Mr. Henry Crowther, F.R.M.S., who also submitted a table of classification based upon the dental system.

The Recorder showed a number of Scottish shells and slugs sent for authentication and record by Mr. W. Evans, F.R.S.E., which included *Ancylus fluviatilis*, *Hyalinia nitidula*, **Clausilia perversa*, *Arion subfuscus*, *A. minimus*, **Succinea putris*, *Vitrina*, *Hyalinia alliaria*, *H. pura* var. *margaritacea*, *H. radiatula*, *H. crystallina*, *H. fulva*, **Helix lamellata*, **H. fusca*, **H. rotundata*, *Vertigo edentula*, *Cochlicopa lubrica*, and *Limnæa truncatula* from Aviemore, *H. hortensis* var. *lutea* 12345 and *Limax cinereoniger* from near Rothiemurchus, the last named also from Loch an-Eilan, and **Pisidium pusillum* and **P. fontinale* from Loch Phitinlais, those marked with the asterisk (*) being new authentications for the vice-county of Easternness.—W.D.R.

SOME REMARKS WITH RESPECT TO
MR. WOTTON'S PAPER ON THE LIFE-HISTORY OF
ARION ATER.

BY DR. HEINRICH SIMROTH, GOHLIS BEI LEIPZIG.

(Read before the Conchological Society, May 3, 1893).

THE accuracy of keeping and breeding *Arion ater* to a state of maturity is admirable and Mr. Wotton is to be congratulated sincerely on his success. Every one who has taken pains with the subject will know that this species commonly endures in captivity for a long time without getting ripe. My own experiences reach only over few months. But the late Baron von Maltzan told me that he had kept *Arion empiricorum* for several years, during which time the animals increased very slowly. Evidently the species needs much understanding of its habits.

But another point seems to me less certain. That *Arion ater* propagated when isolated from its youth is very interesting; nevertheless, Mr. Wotton's interpretation of the fact is perhaps to be doubted. As the author thinks, the act depends on self-fertilization. Possibly the eggs were developed without impregnation. At least, the question is to be kept open. We have examples of self-copulation and those of propagation under isolation. Already C. E. von Baer saw a *Limnæa* introducing its penis into its vulva. This is presumptively possible only where the male and female orifices are separated. On the other hand, Braun, e.g., observed the propagation of *Limnæa* under isolation from the egg-state, without deciding, I think, whether it was self-fertilization or parthenogenesis. Plate has lately described a channel between the penis and the vagina in some *Testacellæ*¹, and he brings forward the opinion that the arrangement would permit self-fertilization if the occasion of

¹ L. Plate, 'Studien über opisthopneumon, Lungenschnecken,' Zool. Jahrb., iv., 1891.

copulation is wanting. In *Vaginula* a channel joins directly the vas deferens with the receptaculum, etc. Therefore, the possibility of internal self-fertilization cannot be denied, but I think it is likely to be restricted to the cases where peculiar arrangements are present for that purpose. We have now enough experience that eggs which commonly are impregnated possess the capability of development without fertilization. In the eggs of *Bombyx mori* the fertilization can be substituted by mechanical or chemical irritation, brushing, acids, etc. Most important seems to me the fact that there is a slug in which often the male parts, vas deferens and penis, are wanting altogether. I have had series of purely female individuals of *Agriolimax laevis*, our smallest cosmopolitan Limacid, from Germany, Madagascar, and Mexico. The figure given by Dr. Scharff² means the same. With this form parthenogenesis is very probable, and therefore, I think, with *Arion ater*. Mr. Wotton alone is likely to be able to decide the problem by experiment. For this purpose another individual should be bred under isolation and should be killed after having deposited only a few eggs, the capability of development of which is to be proved. If then no spermatozoa are present, either in the receptaculum nor in the genital tube, then parthenogenesis would be demonstrated; in the contrary case internal self-fertilization would be probable. Certainly the decision would be of high interest.

Finally, another remark. The restless external parasite Mr. Wotton describes is *Acarus limacum*, an acarine animal.

Planorbis albus v. sulcata.—Shell with strong curved ridges in the line of growth, of which there are about thirty on the last whorl, the intervening spaces being occupied by broad sulci from which the variety takes its name.

Pond near Leeds.

To Mr. Nelson belongs the credit of discovering this striking modification of our well-known species. The specimen he kindly presented me with is about the usual size attained by the species in this district, and the usual spiral striation is fairly visible. The upper aspect recalls the general appearance of *P. nautilus* v. *crista* minus the spinules.—J. W. TAYLOR, June 20th, 1893.

² R. F. Scharff, 'The Slugs of Ireland,' Scient. Trans. R. Dublin Soc., 1891, pl. lviii., fig. 29.

THE LAND AND FRESHWATER MOLLUSCA OF
TRINIDAD.

BY R. J. LECHMERE GUPPY.

(Read before the Conchological Society, March 1st, 1893).

THE 'Journal de Conchyliologie' for January, 1890, contains a paper by H. Crosse on 'The Land and Freshwater Mollusca of Trinidad,' accompanied by a neatly-executed plate. I am glad that M. Crosse has taken this work in hand, and that he has given us figures of some of the species. Others still await iconographic representation.

Descriptions of some of the land and freshwater shells of Trinidad were published by me in the 'Annals and Magazine of Natural History' (1864, 1866, 1868), the 'American Journal of Conchology' (1870), and the 'Proceedings of the Zoological Society of London' (1875). The latter publication contained a list of the species, and another appeared in the 'Quarterly Journal of Conchology' (1875). Subsequent information enables me to make some rectifications in the nomenclature, and on one or two points I can add further particulars to those given by M. Crosse.

I had thought of adding a table giving the geographical distribution of the species composing our molluscan fauna. I did this partially in my paper in the 'Annals and Magazine of Natural History' for January, 1866, and M. Crosse has done it more fully in his paper of January, 1890. But I find that with the extension of our knowledge we are compelled to reduce the number of specific names, and that as these are reduced the geographical range of species is increased, consequently the number of forms peculiar to any part of the region is lessened. I do not think it desirable, therefore, until the nomenclature of South American and West Indian land and freshwater mollusca is more settled and better defined to give such a table.

I proceed to give a catalogue of the species. As the original authorities have been quoted by Crosse, I do not think it necessary to occupy space with them here, but, where possible, I give a citation of a figure.

1. *Geostilbia minutissima* Guppy.

Glandina minutissima Guppy, Proc. Scient. Assoc. Trinidad, 1869, p. 239. Crosse, 'Journal de Conchyliologie,' Jan., 1890, p. 36, pl. ii., f. 1.

A very minute glassy hyaline smooth shining fusiformly-cylindrical shell with five whorls, of which the last forms more than half of the length of the shell; spire short, with an obtuse apex; aperture elongate-oval, narrow above, wide below; outer lip simple; columella scarcely truncate; height 2 mill.; diameter $\frac{3}{4}$ mill.

A minute shell, bearing some resemblance in general aspect to *Glandina* (e.g. *Gl. solidula* Pf. Cuba). It varies a good deal.

In 1867 M. Crosse described ('Journ. de Conch.,' vol. xv., p. 184) the genus *Geostilbia*. The following species have been attributed to it:—

1 **iota** Adams, Jamaica.

mazei Crosse, 'J. de C.,' 1883, p. 7, pl. i., f. 2, Guadeloupe.

2 **caledonica** Crosse, 'J. de C.,' 1867, p. 184, pl. vii., f. 4, New Caledonia.

3 **blandiana** Crosse, 'J. de C.,' 1880, p. 149, and 1886, p. 137, pl. i., f. 4, Para.

4 **mariei** Crosse, 'J. de C.,' 1880, p. 149; 1881, p. 200, pl. viii., f. 5, Nossibe.

5 **gundlachi**, Pf. 'J. de C.,' 1883, p. 7, pl. i., f. 1, Guadeloupe.

6 **comorensis** Mor., 'J. de C.,' 1883, p. 196, pl. viii., f. 7, Comors.

To these we may have to add the following, or some of them:—

Achatina michaudiana Orb., 'Moll. Cuba,' vol. i., p. 170, pl. xi., f. 10—12, Cuba.

A. lowei Paiva, 'J. de C.,' 1866, p. 339, pl. xi., f. 1, Madeira.

A. balanus Bens. (*Cecilianella isseli* Pal.), Aden, etc.

If any validity is to be assigned to the genus *Geostilbia*, our present shell may probably be found to be a member of it, and perhaps synonymous with *G. blandiana* Crosse, and, further again, even with *Achatina iota* Adams, and *G. mazei* Crosse. It is, I think, likely that *Geostilbia* may take rank as a sub-genus of *Cionella*.

2. *Spiraxis simplex* Guppy.

Crosse, 'Journ. de Conch.,' Jan., 1890, p. 37, No. 4.

A turreted longitudinally sinuate-plicate shell of eight or nine whorls, white, under a light straw-coloured epidermis. Length 12—15 mill., diameter 4—6 mill.

This shell, which is rather rare, is a great deal like a large *Stenogyra*, but it has the sinuate outer lip and the twisted columella ascribed to *Spiraxis*. It is much larger than its congeners *swiftiana* and *paupercula*, but it is smaller than *Sp. dunkeri* Pf. (Haiti).

3. *Stenogyra octona* Chemn.

Crosse, l.c., p. 44, No. 25.

Mr. Edgar A. Smith remarks (in Ann. & Mag. Nat. Hist., Sept., 1891, p. 253,) on the wide distribution of this shell, which is found in all, or almost all, the West Indian Islands, over a large part of tropical America, and in some of the Polynesian Islands. Specimens from Central Africa and Madagascar seem identical also. On this subject see Adams, 'Contributions to Conchology,' 1849, p. 48. It is probable that some shells described under other names (e.g. *Stenogyra mauritiana* and *St. mamillata*) are identical. Among those whose distinctness is doubtful I would include *St. striatella* Rang. and *St. terebraster* Lam., though the latter is indeed placed in a different section by Albers and Von Martens.

4. *Stenogyra caracasensis* Reeve.

Opeas caracasensis Crosse, l.c. p. 45, No. 26.

A thin horny shell of about eight slowly increasing whorls, and a rather obtuse apex. Height 10 mill., diameter $2\frac{1}{2}$ mill.

Much rarer and of a more limited geographical distribution than the last. Its characters are in some respects unlike those of most shells assigned to the genus.

5. *Stenogyra plicatella* Guppy.

Opeas plicatella Crosse, l.c. p. 45, pl. ii, f. 2.

A thin slender elongate-cylindrical sinuate-striate shell with eight or nine whorls. Height 12 mill., diameter 3 mill.

M. Crosse states the opinion of Bland ('Amer. Journ. Conch.,' vol. iv., p. 185, 1868), that I have confounded under this name two previously-described species, namely, *St. octonoides* Adams, and *St. subula* Pf. It may be that Bland is right, but in this event these two species are only one. Our Trinidad form is more different from the examples I have seen of the two species named than these are from one another. But it may readily be inferred that the shells described under these names are only local races of one species, for which the preferable name may be *St. subula* Pf. *Bulinus hortensis* Adams (Jamaica) may be added likewise to the synonymy.

6. *Cionella lamellata* P. & M.

Leptinaria funcki Bland (as of Pfeiffer).

L. blandiana Pf., Crosse, l.c., p. 46, No. 29.

An elongate-ovate colorless or waxy-white shell, with a truncate columella, a simple outer lip, and a lamellar parietal tooth. Height 13—15 mill., diameter 6 mill.

I cannot appreciate the characters on which Pfeiffer has separated the Trinidad form from that of the Antilles and South America.

The name *funcki* was bestowed upon the Granada form because a similar shell had been described under that name

from New Granada. Funck collected in the latter country and not in the Antilles. The Granada shell is *C. (Tornatellina) lamellata* as given in my paper on the shells of that island ('Ann. & Mag. Nat. Hist.,' June, 1868, p. 437).

7. *Zonites guildingi* Bland.

Stenopus guildingi Bland, 'Ann. Lyc. Nat. Hist. New York,' vol. viii., p. 157.

Zonites guildingi Crosse, l.c., p. 38, No. 6.

A very thin amber-colored umbilicate depressed-orbiculate shell, with a lunate aperture. Height $4\frac{1}{2}$ mill., diameter 9 mill.

Apart from the undesirability of retaining the name *Stenopus* for a genus of mollusca, there are objections to the original constitution of the genus for such dissimilar shells as *lividus* and *cruentatus*. The import of the designation was misconceived by Woodward, who regarded the name as equivalent to *Nanina*. But his authority, second to none as regards marine mollusca, does not stand so high in reference to land shells. We have scarcely yet, indeed, arrived at a satisfactory solution of the difficulties which beset the determination of the limits of the genera *Zonites*, *Hyalina*, *Macrocyclus*, etc.

The figures given by D'Orbigny of his *Helix nitensoides* ('Moll. Cuba,' pl. x., f. 9—12) bear much likeness to our shell. In the text (vol. i., p. 161) that author notices the resemblance to *H. cellaria* and *H. nitens*. I should not be surprised if D'Orbigny's shell (of which the habitat is Cuba) and ours were to prove specifically identical.

8. *Zonites implicans* Guppy.

'Amer. Journ. Conch.,' 1870, p. 307, pl. xvii., f. 2.

Crosse, l.c., p. 39, No. 7.

A minute widely-umbilicate discoidal shell, with four depressed whorls. Height $\frac{1}{2}$ mill., breadth 2 mill.

9. *Zonites umbratilis* Guppy.

'Amer. Journ. Conch.,' 1870, p. 307, pl. xvii., f. 3.

Crosse, l.c., p. 39, No. 8.

A minute umbilicate heliciform shell, with 5—6 whorls. Height $\frac{3}{4}$ mill., diameter $1\frac{1}{2}$ mill.

The difficulty here again arises with reference to these two species as to which is their true generic position.

In my original description of *Zonites umbratilis* there was an error, as pointed out in a note to page 207 of 'Amer. Jour. Conch.,' 1870. The umbilicus is deeper but not wider than it is in *Z. implicans*. The difference in the form of these shells is made evident by the figures cited above. These differences are similar to those between *H. ammoniformis* Orb. and *H. bourno-bæna* Orb. (Amer. Merid.), which are possibly allied to our species.

10. *Guppya livida* Guilding.

Guppya vacans Crosse, l.c., p. 38, No. 5.

This varies so much in shape at different stages of growth that young and adult examples might easily be taken for different species. The texture is transparent shining horny brown, with microscopic revolving and cross lines. The surface characters of the shell are like those of *Conulus chersina* Say, as figured by Morse in the Journal of the Boston Society of Natural History (1864). The young shell is subperforate and its whorls are carinate. As it grows these characters become modified, and the contour becomes more rounded.

It would be difficult to say what species should be assigned to the genus, but *Guppya selenkai* of Mexico is one, and *G. gundlachi* Pf. another. (See Tate, 'Amer. Journ. Conch.' 1868, p. 154.

11. *Macrocyclus alicea* Guppy.

Hyalina alicea Crosse, l.c., p. 39, No. 9.

A depressed planorbiform shell of about 5—6 whorls, rather evenly convex above and openly umbilicate beneath. Diameter 8 mill., height $2\frac{1}{2}$ mill. In shape it approaches *H. concolor* Fér., but its color and texture are more like those of *Macrocyclus concava*. It is, however, much smaller. This species, found only in the northern mountains of Trinidad,

bears a resemblance to the *Stenopus cruentatus* of Guilding. From *Guppya livida* it differs widely in shape and structure. In shape it is nearer to *Zonites guildingi*, but it has a widely open umbilicus and its colour and texture are very different. The present shell is almost a miniature of *Macrocyclus voyana* Newc. (California). A caudal appendage has not been observed in *M. alicea*, but it nevertheless may exist.

12. *Helix coactiliata* Fér.

Crosse, l.c. p. 40, No. 13.

Helix parkeri Tryon.

H. bridgesi Lea.

H. suturalis Pfeiffer.

H. cordovana Pf.

A planorbiform species recalling the European *H. ericetorum*. Its synonymy will partly indicate the wideness of its distribution.

Of the species of the genus *Helix* (*sensu strictiore*) found in Trinidad this is the largest, the others all being minute. This appears to be very rare and local, as I have only once found it. Had it not been discovered under circumstances which precluded the idea of its being introduced I should have hesitated in retaining its name in the list of our local fauna.

13. *Helix bactricola* Guppy.

'Amer. Journ. Conch.,' 1870, p. 307, pl. xvii, f. 5.

Crosse, 'Journ. de Conch.,' 1890, p. 39, No. 10.

A small pyramidal deeply-umbilicate fuscous-horny *Helix*, with seven narrow slowly-increasing closely costellate whorls carinate on the periphery. Height $2\frac{1}{2}$ mill., diameter 4 mill.

I know of no very near ally to this shell. Its surface ornamentation is somewhat like that of *H. rotundata* and other members of the section *Patula*. Another shell having similar ornamentation is *Helix labyrinthica* Say, but our *H. bactricola* wants the reflector lip and the laminar tooth (or teeth) of that shell, which, however, it approaches somewhat in general shape.

14. *Helix ierensis* Guppy.

'Amer. Journ. Conch.,' 1870, p. 307, pl. xvii., f. 4.

Crosse, 'Journ. de Conch.,' 1890, p. 40, No. 11.

A horny-brown trochiform very obliquely costulate deeply umbilicate little shell of about five whorls. Height 2 mill., diameter 3 mill. The character of the ornamentation in this and the following species is rather that of slightly irregular lamellæ instead of minute regular rounded riblets as in the preceding species.

It has occurred to me that this and the following are two forms (or perhaps sexes) of the same species; and a similar idea has also occurred to me in reference to *Zonites implicans* and *umbratilis*. I am not in a position to advance any evidence in support of this view.

The *Helix guatimalensis* of Crosse and Fischer ('Journ. de Conch.,' 1873, p. 274, pl. ix., f. 3), and the *H. cacoides* of Tate ('Amer. Journ. Conch.,' 1868, p. 155, pl. xvi., f. 3), seem to be closely akin to if not identical with this.

15. *Helix cæca* Guppy.

Crosse, l.c., p. 40, No. 12.

This resembles the preceding in most characters, but differs in being more elevated and less openly umbilicated. The form of the whorls gives also a more circular contour to the aperture.

16. *Orthalicus undatus* Brug.

Shuttleworth, Not. Mal. p. 63, pl. iii., f. 4—5.

Bulimus zebra Guppy, 'Ann. & Mag. Nat. Hist.,' Jan. 1866, p. 48.

Orthalicus zebra Crosse, 'Journ. de Conch.,' 1890, p. 41, No. 15.

Bland ('Amer. Journ. Conch.,' 1868, p. 185) remarks on this, "The apical whorl in the Trinidad shells (and also in the Florida specimens) is of a dark purplish brown color. Shuttleworth describes the apex of *O. zebra* as immaculate." D'Orbigny's figures of the shell (under the name of *B. zebra*) are very good ('Moll. Cuba,' pl. vi., f. 9—10.)

I may observe that the form from the Grenadines described by Guilding as *B. undulatus* has more claims to be ranked as a species than many shells admitted without question as such.

17. *Bulimus oblongus* Müll.

Wood, I. T. 'Helix,' pl. 33, f. 101 (not 102).

D'Orbigny, 'Voy. Amer. Merid.,' pl. xxxvii, f. 1.

Woodward, 'Man. Moll.,' pl. xii., f. 10.

Crosse, 'Journ. de Conch.,' 1890, p. 40, No. 14.

I have given a note on some of the anatomical characters of this mollusk in Proc. Zool. Soc., 1892, p. 271.

18. *Bulimus glaber* Gmelin.

var. *auris-sciuri* Guppy.

Crosse, l.c., p. 40, No. 16.

19. *Bulimulus pilosus* Guppy.

'Amer. Journ. Conch.,' 1870, p. 310, pl. xvii., f. 12 (not 9).

Crosse, 'Journ. de Conch.,' 1890, p. 43, No. 20, pl. ii., f. 3.

An oblong-conic thin horny-brown-colored shell of about 6 whorls covered with a fine pubescence. Length 14 mill., diameter 7 mill. Allied to *B. debilis*, *constrictus*, &c., of South America. I note the resemblance in shape to species of the genus *Buliminus* (e.g. *gruereanus* and *tarnieranus*, Grasset—Canaries, 'Journ. Conch.,' 1856, p. 346, pl. xiii).

20. *Bulimulus tenuissimus* Fér.

Crosse, l.c., p. 43, No. 19.

An oblong-conic thin pale horny-brown or almost colorless shell of about seven whorls, differs from the preceding in its more elongate proportions and the absence of pubescence. Its umbilicus is only a chink. Length 18 mill., diameter 8 mill.

21. *Bulimulus aureolus* Guppy.

Crosse, l.c., p. 42, No. 17.

A subperforate ovate-conic rather acuminate thin yellow shell of 5—6 whorls, sometimes banded. Length 25 mill.,

diameter 10 mill. A shell belonging to the group of which *B. poecilus* Orb. is a member. It is certainly very near to *B. vincentinus* which is distinguished from it by its expanded outer lip. I have described several varieties as follows :

α *typicus* (yellow).

β *albescens* (white).

γ *fasciatus* (banded).

δ *imperfectus* (small banded).

ϵ *rawsoni* (dead white with yellow umbilicus and apex).

The latter is figured in 'Amer. Journ. Conch.,' 1870, pl. xvii., f. 6. It inhabits Tobago.

22. *Bulimulus vincentinus* Pfeiff.

Crosse, l.c., p. 42, No. 18.

A subperforate ovate-conic acuminate thin yellow white or fivebanded shell with an expanded outer lip. Length 34 mill., breadth 14 mill.

This has varieties parallel with those of the last.

23. *Cylindrella trinitaria* Pfeiff.

'Malak. Blatt.,' vol. vii., p. 213, pl. ii., f. 4—7.

Crosse, l.c., p. 43, No. 21.

A slender cylindrical-turreted costulate-striate dark-brown shell with a produced subquadrate aperture. Length 11 mill., diameter $2\frac{1}{2}$ mill. Nearest to *morini* Mor. and *costata* Guild. It also inhabits Venezuela.

24. *Pupa uvulifera* Guppy.

Crosse, l.c., p. 44, No. 22.

A small ovate-cylindrical shell with 5—6 whorls and an aperture furnished with teeth or plaits. Length 3 mill., diameter 1 mill. It is very near to *P. pellucida* Pf., a shell widely distributed in the West Indies.

I think it possible that the shell I described as *Pupa auriformis*, and of which I never found more than a single specimen, may be a variety or accidental form of this.

25. *Pupa eyriesi* Drouet.

Drouet, 'Moll. Guy. franç.,' p. 71, pl. ii., f. 16—17.

Crosse, l.c., p. 44, No. 24.

A very minute short and obtusely-cylindrical shell of about five whorls, the last deeply impressed near the aperture, the reflected outer lip being thus sinuate: apex very obtuse. Height $1\frac{1}{2}$ mill., diameter 1 mill.

It is probable that this species described by Drouet from French Guiana is more widely distributed than is thought, and perhaps it is recorded under other names from other places. The Guadelupe *P. indigena* (Ancey) may perhaps be the same; but the specimens I have received as *P. eyriesi* from that island are more like *P. pellucida*, while the Trinidad shell agrees fairly in the characters of the aperture with Drouet's figure, and only differs in having a more obtuse apex. The teeth of the aperture vary in number in different examples. When they are all developed the figure is a good representation of the aperture.

26. *Ennea bicolor* Hutton.

Crosse, l.c., p. 37, No. 2.

Chenu, 'Man. Conch.,' vol. i., p. 444, f. 3281.

A cylindrical shell with a somewhat obtuse apex and an aperture furnished with three teeth or plaits; columella and outer lip expanded and reflected. Length 7 mill., diameter 2 mill.

On the occurrence of this shell in the West Indies see Bland, 'Ann. Lyc. Nat. Hist., New York,' vol. vi., p. 147.

27. *Streptaxis deformis* Fér.

Chenu, 'Man. Conch.,' vol. i., p. 451, f. 3362.

Crosse, l.c., p. 37, No. 3.

A subtransparent whitish shell with a thickened outer lip and a lamellar parietal plait. Length $6\frac{1}{2}$ mill., diameter 5 mill. These are usual dimensions, but we have a variety of somewhat

larger size, which is undistinguishable from *Streptaxis glaber* Pf. I should be inclined also to add *S. deplanchei* Drouet to the synonymy.

28. *Simpulopsis corrugata* Guppy.

'Journ. Conch.,' 1878, p. 323, pl. x., f. 3.

Crosse, 'Journ. de Conch.,' 1890, p. 46, No. 30.

A greenish-hyaline membranaceous shell, wrinkled or corrugated. Height 10 mill., diameter 8 mill.

I am not quite certain that this is a valid name. Want of means of comparison with named forms sometimes causes the description of a local race as a different species.

29. *Succinea candeana* Lea.

Succinea approximans Crosse, l.c., p. 47, No. 31.

S. margarita Crosse, l.c., p. 47, No. 32.

S. cuvieri Guilding.

I cannot find satisfactory marks of distinction between the *Succineas* (*sensu strictiore*) found in the different islands of the Antilles, nor can I make two races of the Trinidad forms. They vary indeed in proportions, but this, I think, is due only to local conditions. There may be some difficulty in selecting the right appellation, and in 1877 I pitched upon that given here as the preferable one according to my lights. I cannot separate the shells denominated—*cuvieri*, *margarita*, *approximans*, etc., by any decided or definite and permanent character.

30. *Omalonyx felinus* Guppy.

'Journ. Conch.,' 1878, p. 324, pl. x., f. 2.

Crosse, 'Journ. de Conch.,' 1890, p. 48, No. 33, pl. ii., f. 4.

A similar remark applies to this as to the *Simpulopsis*. So far as concerns the shell I see no difference that could be regarded as specific between our specimens and those from Guadelupe, Guiana, and Brazil, and these latter are all referred to *Omalonyx unguis* Fér.; but the soft parts of our *Omalonyx*

differ somewhat from the figure given by D'Orbigny, particularly in respect of coloration. Hence I gave a new name to our shell, but it is possible that they may all turn out to be only one species.

31. *Veronicella occidentalis* Guilding.

Veronicella lævis (Fér.) Guppy.

Crosse, 'Journ. de Conch.' 1890, p. 48, No. 34.

While admitting the force of the arguments urged by Crosse so far as to alter the name *lævis* (Fér.) to *occidentalis* (Guilding), the slug of that specific name having admittedly a range extending over the West Indies and Venezuela, I consider that the name *Veronicella* is the preferable one for the genus. I do not wish to occupy space by a long discussion on the point of nomenclature, but it appears to me that what choice there is is in favour of *Veronicella*. So far as my observations extend the one species of slug found in the neighbouring Antilles is the same as ours, and there is no necessity for the adoption of Semper's name *punctatissima*.

32. *Melampus coffea* L.

Crosse, l.c., p. 49, No. 35.

Woodward, 'Man. Moll.' pl. xii., f. 37.

Auricula ovula D'Orbigny, Moll. de Cuba, pl. xiii., f. 4—7.

33. *Melampus pusillus* Gmel.

Crosse, l.c., p. 49, No. 36.

Wood, Ind. Test., pl. xxix., f. 19.

34. *Pedipes mirabilis* Megerle.

Crosse, l.c., p. 50, No. 38.

These amphibious Auriculidæ have the privilege of appearing in lists both of terrestrial and of marine mollusca, their geographical distribution following the latter, while their zoological affinities appear to be with the land shells.

35. *Ancylus textilis* Guppy.

'Amer. Journ. Conch.,' 1870, p. 311, pl. xvii., f. 9.

Crosse, 'Journ. de Conch.,' 1890, p. 51, No. 41, pl. ii., f. 5.

Approaches *A. moricandi* Orb. (Amer. Merid., p. 355.).
Ancylus parasitans Drouet, from Martinique, is likewise near if not the same. Should these prove to be identical D'Orbigny's name must take precedence; and probably others of D'Orbigny's and other South American and West Indian species may have to be added to the synonymy.

36. *Gundlachia crepidulina* Guppy.

'Amer. Journ. Conch.,' 1870, pl. xvii., f. 10—11.

Crosse, 'Journ. de Conch.,' 1890, p. 51, No. 42.

37. *Planorbis terverianus* Orb.

D'Orbigny, 'Moll. Cuba,' vol. i., p. 194, pl. xiii., f. 20.—22.

Crosse, 'Journ. de Conch.,' 1890, p. 50, No. 39.

38. *Planorbis meniscus* Guppy.

Crosse, l.c., p. 51, No. 40.

Very near to *Pl. haldemani* Adams, Jamaica.

39. *Physa rivalis* Maton and Racket.

Wood, 'Ind. Test.,' Bulla, 38.

Physa sowerbiana Orb., Moll. Cuba, vol. i., p. 190, pl. xiii., f. 11—12.

Crosse, 'Journ. de Conch.,' 1890, p. 52, No. 43.

It is not unlikely that Crosse is right in referring our shell to *Ph. sowerbiana*; but is that shell (from Cuba) any other than a local form of *Ph. rivalis*? The specimens I originally discovered were small, as noted in my paper in 'Annals and Magazine of Natural History,' 1866, but I have since found much larger ones, including two of eighteen millimeters in length by nine in breadth, dimensions considerably exceeding those of D'Orbigny's figured example, and approaching Guadelupe rather than Martinique specimens of the species. The propor-

tions and shape also are somewhat different, the large shells being more ventricose; but I see no reason to regard them as being other than forms of *Ph. rivalis*. The shell so called by Dillwyn was the *Bulla fontinalis* of Linné, and the latter denomination is retained for it, so there does not appear to be any reason why Maton and Racket's species—the *Physa sowerbyana* of D'Orbigny included—should not keep the name of *rivalis*.

Ph. rivalis is found throughout the West Indies and has a wide distribution on the South American continent. I am of opinion that the *Physa acuta* of D'Orbigny (not of Draparnaud) is also referable to the same species.

40. *Amnicola candeana* Orb.

Paludestrina candeana D'Orb., 'Moll. Cuba,' vol. ii., p. 9, pl. x., f. 13—14.

P. auberiana D'Orb., l.c., p. 8, pl. x., f. 6—7.

Bithinia spiralis Guppy, 'Ann. and Mag. Nat. Hist.,' 3 ser., vol. xiv., p. 244.

P. spiralis Crosse, l.c., p. 53, No. 45.

There is some question here again as to the proper generic designation of the group.

In my original description quoted above (May, 1864) I remarked on the variability of our shell. I regard it as a typical and easily verified instance of a mollusc whose characters admit of several species being made out of one. Having had numbers of it in my aquarium I can assert that a single brood may contain all the various modifications from a smooth shell to one to aculeate spines. There are many analogous cases, and I may call to mind that of the *Vitrinellas* (= *Adeorbis*) of the West Indies, etc., which are given as several species, all probably reducible to one, and the true idea of a species may be regarded as that of a number of individuals such as might be all derived from a single brood, (not, which have all at some time or another been derived from one brood), and all the forms of which might be reproduced from a single pair.

D'Orbigny's *Paludina piscium*, *parchappii*, and perhaps also *australis* (Amer. Merid.) and *Paludestrina affinis* (Moll. de Cuba) are very probably forms of this species. *Paludestrina candeana* and *aubieriana* are quoted from Guadelupe by Maze in 'Journ. Conch.,' 1883 (p. 32). The distribution of the species is probably very wide, and includes the West Indies and tropical South America, and, perhaps, also, Central America. In my above-quoted account in the 'Annals and Magazine of Natural History' the word 'moniliform' was not, perhaps, judiciously used; it was merely intended to denote an incircling row of spines or small tubercles.

41. *Ampullaria cornu-arietis* L.

D'Orbigny, Voy. Amer. Merid. pl. xlviii., f. 7—9.

Woodward, Man. Moll., pl. ix., f. 31.

Crosse, 'Journ. de Conch.,' 1890, p. 53, No. 46.

The noticeable differences between the typical (globular) *Ampullariæ* and those of the section bearing Gray's name *Marisa* (or Guilding's *Ceratodes*). of which the present is the typical species, are that the shell is planorbiform, and nearly but not quite symmetrical, the animal without a long siphon and the operculum thinner. The form of the shell and the organization of the animal adapt it for life in ponds, bayous and backwaters, where its favourite aliment is the water-lily and other aquatic plants.

42. *Ampullaria urceus* Müll.

Wood, Ind. Test., Helix, 72.

Crosse, 'Journ. de Conch.,' 1890, p. 53, No. 47.

A giant among freshwater shells, as *Bulinus oblongus* is among land shells. It has much the same geographical distribution as that mollusc. It frequents the larger streams in great numbers, and buries itself in their beds or banks in seasons of drought.

43. Ampullaria effusa Müll.

Wood, Ind. Test., Helix, 73.

Crosse, 'Journ. de Conch.,' 1890, p. 54, No. 48.

Crosse gives the names of only two of the globular *Ampullariæ*, this and the preceding. I have included the name of *crocostoma* Phil. in some of my later lists; but if specifically distinct from *effusa* it is a very nearly allied shell. We have many varieties of this type of *Ampullaria*, and I have given names to some of them, but it is doubtful whether they ought not all to be included under one species.

44. Cyclotus translucidus Sow.

Neocyclotus translucidus var. *trinitensis* Crosse, 'Journ. de Conch.,' 1890, p. 55, No. 49.

This is not uncommon on calcareous soils throughout the island, except on the hills, where its place is taken by the next.

45. Cyclotus grenadensis Shuttl.

Crosse, l.c., p. 54, No. 50.

This is more rare than the preceding, and affects higher ground, being found chiefly on the mountains.

46. Diplomatina huttoni Pf. var. occidentale Guppy.

Crosse, l.c., p. 55, No. 51.

M. Crosse gives the weight of his opinion against the indigenous character of this mollusc, said to be identical with the Indian form. The latest contribution of mine on the question was printed in 'Annals and Magazine of Natural History,' April, 1886, p. 385. M. Crosse's opinion is also that of so able an authority as Mr. W. T. Blanford, and naturalists generally will no doubt take that view of the case, which is that the shell was imported from India.

47. Truncatella pulchella Pfeiff.

Crosse, l.c., p. 56, No. 54.

I am in doubt again as to the validity of this name. I let it stand for the present, however, but add two more species of the genus which I have found since my last list was printed.

48. *Truncatella bilabiata* Pfeiff.

I should be inclined to add to the synonymy of this species the names of *barbadensis* Pfeiff. and *modesta* Adams. It is very nearly allied to, and perhaps not really distinct from, *Tr. pulchella*.

49. *Truncatella subcylindrica* Gray.

This is near to and possibly identical with *Tr. caribalisensis* Sow.

It is singular that this and the preceding live together side by side, being most abundantly found in sheltered bays at the extreme top of highwater mark. It is unusual for two allied species to be found living on the same ground, except under particular circumstances. What, in this instance, is the particular circumstance which determines the association of two clearly distinct though allied forms I am unable to state. Can it be sexual?

50. *Taheitia reclusa* Guppy.

Blandiella reclusa 'Amer. Journ. Conch.,' 1870, p. 309, pl. xvii., f. 7—8.

Crosse, 'Journ. de Conch.,' 1890, p. 56, No. 53, pl. ii., f. 7.

This mollusca is allied on one hand to *Truncatella* and on the other to *Geomelania*. From the latter it differs in the absence of the linguiform appendix of the labrum and in the rugose operculum.

51. *Cistula aripensis* Guppy.

Crosse, l.c., p. 56, No. 52, pl. ii., f. 6.

An oblong-turreted longitudinally costellate-striate shell, of a reddish-brown color, generally with several more or less interrupted dark spiral bands and an oval aperture, with an

expanded or double concentrically-striate lip. Height 13 mill, diameter 8 mill.

Bland (in 'Amer. Journ. Conch.,' 1868, p. 179) remarks the resemblance of this shell to *Chondropoma cordovanum* Pfeiff., but I think there can be no doubt of its very close affinity to *Cistula tamsiana* Pfeiff. of the neighbouring mainland.

I have observed the existence of two forms in this as in other species of mollusca. These two forms are males and females. The males are constantly smaller than the females. I have noticed this in *Bulimus oblongus*, which I believe to be always functionally unisexual whether or not it is so anatomically; and it is well-known that in certain species (e.g. *Cyclophorus pearsoni* Bens.) there are a large and a small form. These I take to be females and males respectively.

52. *Helicina nemoralis* Guppy.

Crosse, l.c., p. 58, No. 55, pl. ii., f. 8.

A smooth pinkish or yellowish species belonging to the same group as *H. columbiana* Phil., *Zephyrina* Duclos, and *jamaicensis* Sow.

53. *Helicina barbata* Guppy.

Crosse, l.c., p. 58, No. 56, pl. 2, f. 9.

A more obscure and much more common shell than the last. It is stated to be near to or identical with *H. dysoni* Pfeiff., but I have not been able to demonstrate this identity.

54. *Helicina lamellosa* Guppy.

'Ann. and Mag. Nat. Hist.,' 3 ser., vol. xix., p. 260, pl. x., f. 4.
Crosse, 'Journ. de Conch.,' 1890, p. 59, pl. ii., f. 10.

A spirally lirated species belonging to the same group as *H. semistriata* Sow., *H. lirata* Pfeiff., and *H. lineata* Adams. I have designated this group by the name of *Perenna*.

55. *Helicina ignicoma* Guppy.

Crosse, l.c., p. 59, No. 58.

An orbiculate-conoidal radiately sinuate-costellate reddish or yellowish shell. Height 3 mill., diameter $4\frac{1}{2}$ mill. It belongs to the section typified by *H. plicatula* Pfeiff. and *H. rugosa* Pf.

56. *Cyclas incurva* Guppy.

Sphærium incurvum Mazé, 'Journ. de Conch.,' 1874, p. 173.

Pisidium incurvum Crosse, 'Journ. de Conch.,' 1890, p. 61, No. 63.

The Martinique examples sent me by H. Mazé are undistinguishable from ours.

57. *Cyclas punctifera* Guppy.

'Ann. and Mag. Nat. Hist.,' 3 ser., vol. xix., p. 160 (fig.).

Pisidium punctiferum Crosse, 'Journ. de Conch.,' 1890, p. 60, No. 62.

The *Pisidium simile* of Prime (Guadelupe) appears to me identical.

The questions as to whether these shells should be called *Pisidium* or *Cyclas* resolves itself into the question of how far generic names are to go. I readily admit the subdivision of genera to any reasonable extent, but the names given to the subdivisions should not be accorded generic rank. This is a test case, because *Pisidium* may be admitted to have a greater claim to be recognised as a substantive division than many others that are frequently used as generic appellations. The question between the use of the names *Cyclas* and *Sphærium* is of another kind altogether.

58. *Anodon leotaudi* Guppy.

Crosse, l.c., p. 61, No. 64.

I have been at a loss as to what should be considered the nearest relation of our *Anodon*. I am inclined to think it is *A. sirionos* Orb. (as *A. ferrarisii* Orb., Voy. Amer. Merid., pl.

74, f. 4—6). Ours is a little longer in proportion to its depth, but the likeness is otherwise pretty close. It is 100 mill. in length by 55 mill. in depth, and in thickness it is about 33 mill. It is to be regretted that so fine a shell is so rare with us. It is not, I believe, very rare in the localities where it exists, but I have never been able to procure more than two or three specimens.

To the foregoing list of freshwater shells I have in former publications added the name of *Neritina microstoma* Orb., which is an inhabitant of some of our streams. I have never found it more than a mile from salt water. The genus contains freshwater, estuary, and marine species. It furnishes to our marine fauna *N. meleagris* Lam. and *N. viridis* L. Crosse includes *N. meleagris* in the synonymy of *N. virginea* L., and he may be right. But I have been in the habit of regarding these as distinct. Certainly the figure of *N. virginea*, given by D'Orbigny ('Voy. Amer. Merid.,' pl. lvi., t. 1—3), represents a specimen of *N. meleagris*, and I have examples from some of the Antilles as *N. meleagris* which approach *N. virginea* very closely. On the other hand, the *N. meleagris* which inhabits the muddy shores of the Gulf of Paria is considerably different from the *N. virginea* of the Antilles.

The persistence of authors in referring to Trinidad species which do not belong to the island, induces me to add a few words on the point.

In my paper in the "Annals and Magazine of Natural History" for January, 1866, I gave a list of species wrongly ascribed to Trinidad. These were *Cyclostomus citrinus* Sow., *Helix discolor* Fér., and *Helix perplexa* Fér. I find in a paper by Smith and Fielden in the 'Annals and Magazine of Natural History' for September, 1891, that the latter shell is again attributed to Trinidad. It is not found here nor in Barbadoes. Governor Rawson's specimens came from Grenada, which is the true habitat of the species.

In the description of a new genus proposed by them for certain West Indian *Cyclostomaceæ* ('Journ. de Conch.,' 1888, p. 234), MM. Crosse and Fischer repeat the error that *Cyclostomus semidecussatus* (= *C. citrinus* var.) is a native of Trinidad. The only member of the *Cyclostomaceæ* found in this island is *Cistula aripensis*.

In my last list I gave as doubtful three names. Of these *Autonoe riparia* is decided to be identical with *Auricula pel-lucens*, but since my original discovery I have not seen another specimen. Of *Stenogyra coronata* I never saw but one example, and believe it must have been accidentally introduced. I observe that the species is recorded from S. Lucia. Under *Pupa uvulifera* I have stated my belief that *P. auriformis* is only a form of that species.

In Mr. Edgar A. Smith's paper (Report III. on the Mollusca collected by Mr. Ramage in the Lesser Antilles, 'Ann. and Mag. Nat. Hist.,' May, 1889, p. 400) *Helix orbiculata* Fér., and *Bulinus aulacostylus* Pf., are attributed to Trinidad. These statements are copied into the 'Journal de Conchyliologie' for July, 1889, but without mention of the authorities on which Smith based them. These species are not found in Trinidad, and, so far as I know, they are confined to S. Lucia.

In Reeve's Monograph of *Helicina*, *H. rugosa* is ascribed to Trinidad. It did not come from that island. Trinidad de Cuba is probably more correct.

Hyalinia nitida var. **albida** Jeff. in Tipperary.—

Amongst a small collection of Clonmel shells, kindly sent by the Rev. A. H. Delap, was a specimen of the white variety of this species. This form was apparently first differentiated by Jeffreys in 1830 as *Helix nitida* var. β from an Irish specimen supplied by Mr. Dillwyn. Westerlund makes a sub-var. *viridescens* to embrace those specimens with a greenish tinge, and this has also been recorded from Valentia, and was really the precise form intended to be indicated by Jeffreys in 1830.—J. W. TAYLOR, Aug. 20th, 1893.

CONTRIBUTIONS TOWARDS A LIST OF THE
MARINE MOLLUSCA OF THE UPPER PORTION
OF LOCH LINNHE, ARGYLLSHIRE.

BY G. A. FRANK KNIGHT, M.A., BEARSDEN, GLASGOW.

(Read before the Conchological Society, July 5th, 1893).

I am uncertain whether any record of conchological research in the upper part of Loch Linnhe has hitherto been submitted to the Society, and I have therefore pleasure in tabulating the results of a few weeks' stay during 1891, at Onich, near Balachulish. This village lies at the head of Loch Linnhe proper. On the north, however, the loch is continued through Corran Narrows under the name of Loch Aber, till it joins the Caledonian Canal, while on the east also, under the name of Loch Leven, it winds at the base of the peaks which overhang the savage pass of Glencoe.

The peculiarity of the locality is the double system of tide races, occasioned by the narrow entrances of the latter two lochs. Loch Aber, for instance, empties itself at an ebb speed of often nine to twelve miles an hour, and the result is the formation of two gigantic banks which line the channel, the western being known as Salachan Point, the eastern as Cuilchenna Point. The latter, especially, is rich in mollusca; at low water it is bare for about one third of a mile, and for another third it is only two to four fathoms under water. Then comes a sheer descent of further twenty fathoms, to the natural level of the surrounding sea bottom. Nowhere in the neighbourhood is the depth greater than twenty-four fathoms, except in a few holes towards Balachulish, known to fishermen.

I may say that my dredging was conducted alone, and in this way only a light dredge, one weighing nine pounds, with twelve inch blades, could be used. When a stiff breeze sprang

up, or the tide caused me to drift; it was my custom to make for shallower water, cast anchor, sift out my *debris*, and return again to the sport. Nothing could be more enjoyable than dredging in these northern lochs, with curious visitants such as seals every now and then swimming around the boat, and with a surrounding landscape of such a magnificent sweep of mountains to gaze upon.

The most interesting result of the work was the discovery of a great number of *Rissoa abyssicola* (Forb.) in eleven, fourteen, and twenty-four fathoms. Forbes gave this beautiful shell this 'abyssal' title from the fact that he had found it only at great depths, but the sand and gravel bottom at Onich had many living specimens, perhaps most abundantly at the twelve fathom line. Many years ago Frank Buckland, in company with Rev. Dr. Stewart (the well-known 'Nether-Lochaber'), dredged this neighbourhood and thought they had finished its resources, Buckland particularly being struck with the fact that not a single *Pecten* valve was found. Dr. Stewart, however, remarked to me that somehow or other I had 'simply walked between their legs and found treasures which had escaped them,' a fact which shews how we should never despair of any locality, however well worked.

Mr. J. T. Marshall, of Torquay, has very kindly examined and identified the minuter forms, and once more proved the courtesy for which he is well known.

In the following list of species obtained by dredging and otherwise, the arrangement followed is that of Jeffreys' 'British Conchology.'

Anomia ephippium L. Valves.

Ostrea edulis L. Valves, Cuilchenna Point.

Pecten pusio (L.). Loch Leven Ferry.

P. varius (L.). 14 fathoms.

P. opercularis (L.). Valves.

P. septemradiatus Müll. Valves.

P. maximus (L.). Valves, Cuilchenna Point.

- Lima elliptica* Jeff. 14 f., occasional.
Mytilus edulis L.
M. edulis var. *incurvata* Penn. Kentallen Bay.
M. modiolus L. Cuilchenna Point.
Crenella decussata (Mont.) One in 12 f.
Nucula sulcata Bronn. 14 f.; one dead and valves.
N. nucleus (L.). 12 f., numerous.
N. nitida G. B. Sow. 8—15 f., very plentiful.
Montacuta bidentata (Mont.). 11—15 f., fairly common.
M. ferruginosa (Mont.). 12 f., perfect, but not living.
Lucina spinifera (Mont.). 14—24 f., in abundance.
L. borealis (L.). 11—14 f., not common.
Axinus flexuosus (Mont.). 14—24 f., fairly common.
A. croulinensis Jeff. 24 f., in abundance.
Cardium echinatum L. Valves.
C. nodosum Turt. 8 f.
C. edule L. At Salachan and Cuilchenna Points.
C. minimum Phil. 20 f., two specimens.
Cyprina islandica (L.). 14—24 f., of all ages and sizes.
Astarte sulcata (DaC.). 14 f., abundant.
A. sulcata var. *elliptica* (Bro.). Valves.
A. compressa var. *striata* (Leach). 14 f., three specimens.
Circe minima (Mont.). Cuilchenna, occasional.
Venus exoleta L.
V. linctata Pult. 15—24 f., of all ages.
V. fasciata (DaC.). 15 f.
V. ovata Penn. 14 f., occasional.
V. gallina L. 14 f., sand, in enormous quantities, young.
V. gallina var. *laminosa* Mont. 14 f.
Tapes virgineus (L.). Cuilchenna.
T. virgineus var. *sarniensis* (Turt.). Cuilchenna.
T. pullastra (Mont.). Cuilchenna, numerous, beautifully marked.
T. decussatus (L.). Cuilchenna.
Lucinopsis undata (Penn.). 12—24 f.

- Tellina tenuis* DaC. Cuilchenna.
T. fabula Gron. 12 f.
Psammobia ferroënsis (Chem.). 24 f.
Mactra solida L. Cuilchenna.
M. solida var. *elliptica* Bro. Cuilchenna.
M. subtruncata (DaC.). Valves.
Scrobicularia nitida (Müll.). 14—21 f., plentiful.
S. alba (Wood). 21 f., fairly numerous.
Solen pellucidus Penn. 14 f., frequent.
S. siliqua L. Cuilchenna.
S. siliqua var. *arcuata* Jeff. Cuilchenna.
Lyonsia norvegica (Chem.). 12 f., three good specimens.
Thracia prætenuis (Pult.). 12—24 f.
T. papyracea (Poli). Numerous at Cuilchenna.
T. papyracea var. *villosiuscula* (Macg.). Three good specimens, Cuilchenna.
T. convexa (W. Wood). 15 f., several large valves, two living young.
Neæra abbreviata Forb. 24 f., valves.
N. cuspidata (Olivi). 15—24 f., several.
Corbula gibba Olivi. 14—24 f., very numerous.
C. gibba var. *rosea* Bro. 12 f., four specimens.
Mya arenaria L. Cuilchenna.
M. truncata L. Cuilchenna.
Saxicava rugosa (L.). 3, 14, 24 f., in fair numbers.
Dentalium entalis L. 14 f., fairly plentiful.
Chiton cinereus L. 3—14 f.
C. lævis Mont. 14 f.
Patella vulgata L. Onich shore.
P. vulgata var. *elevata* Jeff. Kentallen Bay, very much 'elevated.'
P. vulgata var. *picta* Jeff. Onich shore.
P. vulgata var. *depressa* Penn. Onich shore.
P. vulgata var. *cærulea* L. Onich shore.

Tectura testudinalis (Müll.). Abundant and fine on Onich shore.

T. virginea (Müll.). 3—8 f., plentiful.

T. fulva (Müll.). 3 f., a few dead.

Emarginula fissura (L.). Culchenna.

Trochus grœnlandicus Chem. Loch Leven Ferry.

T. magus L. 12 f., a few mature specimens.

T. tumidus Mont. 12 f., in fair abundance.

T. cinerarius L. Onich shore, and very plentiful on tangle from 2 f.

T. umbilicatus (Mont.). Rather scarce.

T. millegranus Phil. 3—14 f., numerous.

Lacuna divaricata (Fabr.). Scarce, at low water.

L. puteolus (Turt.). 8 f.

Littorina obtusata (L.).

L. rudis Maton.

L. rudis var. *sulcata* (Leach). Onich shore.

L. littorea (L.).

Rissoa reticulata (Mont.). 14 f., one living.

R. abyssicola Forb. 11, 14, 24 f., in abundance.

R. parva (DaC.). 8 f., only one living.

R. inconspicua Ald. 8 f., two living.

R. violacea Desm. 8 f., two dead.

R. striata (Ad.). 11—15 f., six living.

R. soluta Phil. 8 f., two living.

Hydrobia ulvæ (Penn.). Scarce.

Turritella terebra (L.). 14 f., one hundred and fourteen large living specimens; young ones in great abundance.

Odostomia pallida (Mont.). 11—14 f., six living.

O. conoidea (Broc.). 24 f., one dead, but perfect.

O. insculpta (Mont.). 11—14 f., five living.

O. rufa (Phil.). 11—14 f., two dead.

O. rufa var. *fulvocincta* (Thomp.). 14—21 f., numerous.

O. acicula (Phil.). 14 f., only one living.

Velutina lævigata (Penn.). 12 f., one living.

- Aporrhais pes-pelecani* (L.). 14 f., very numerous alive,
but generally worn.
- Cerithium reticulatum* (DaC.). 7 f., scarce.
- Purpura lapillus* (L.).
- Buccinum undatum* L.
- Fusus antiquus* (L.).
- F. gracilis* (DaC.).
- Nassa incrassata* var. *minor* Jeff. Scarce.
- Defrancia linearis* (Mont.). 7 f.
- Pleurotoma brachystoma* Phil. 14 f., two good living
specimens.
- P. rufa* (Mont.). 24 f.
- P. turricula* (Mont.). 14—24 f., plentiful.
- Cylichna nitidula* Lov. 12 f., scarce.
- C. cylindracea* (Penn.). 12 f., large and plentiful.
- Philine scabra* (Müll.). 12 f., fragments.
- P. aperta* (L.). Fragments.

CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND.

PROCEEDINGS.

214th MEETING, WEDNESDAY, JULY 5th, 1893.

Held at the Philosophical Hall, Leeds.

Mr. William Nelson, Hon. Curator, in the Chair.

Donations to Library announced and thanks voted: From the Institute: Transactions of Wagner Free Institute of Science of Philadelphia, Vol. III., Part 2, Dec.; 1892.

From the respective Editors: *Feuille des Jeunes Naturalistes* for June and July; *The Naturalist* and the *British Naturalist* for July.

From the Society: Abstract Proceedings of Linnean Society of New South Wales, 26th April, 1893.

Donation to Collections announced and thanks voted:

From Mr. John W. Taylor, F.L.S.: A large number of shells, land, freshwater, and marine, from British and foreign localities.

Candidates Proposed for Membership:

Mr. John Roseburgh (proposed by Mr. John W. Taylor, F.L.S., and Mr. William Nelson); and Mr. Charles Edward Wood (proposed by Mr. H. Crowther, F.R.M.S., and Mr. W. Denison Roebuck, F.L.S.).

Papers Read:

A short note 'On a Variety of *Cypræa cruenta* Gmel.' by Mr. James Cosmo Melvill, M.A., F.L.S., was read [printed in 'J. of C.,' July, 1893, p. 194].

A paper entitled 'Contributions towards a List of the Marine Mollusca of the upper portion of Loch Linnhe, Argyllshire,' by Mr. G. A. Frank Knight, M.A., was read [printed at p. 232 of the present Number].

Exhibits:

On behalf of Mr. Tom Petch, B.A., of King's Lynn, were shown a fine typical very pale-coloured adult of *Limax marginatus* (= *arborum*) and a juvenile example of *L. maximus* var. *fasciata* from Holt, East Norfolk, where they had been found on a wall, after a thunder shower.

215th MEETING, WEDNESDAY, JULY 26th, 1893.

Held at the Philosophical Hall, Leeds.

Mr. Henry Crowther, F.R.M.S., in the Chair.

Donations to Library announced and thanks voted: From the respective Authors: L. E. Adams on Conchology as a Popular Science, 1893; W. Moss and F. Paulden on the Reproductive Organs of *Bulimus acutus*, with plate, 1893; P. B. Mason on the Irish Aran, with seven plates; Heinrich Simroth, Some Remarks with reference to Mr. Wotton's paper on the Life-History of *Arion ater*, 1893; R. J. Lechmere Guppy on The Land and Freshwater Mollusca of Trinidad, 1893; R. Standen on Land and Freshwater Mollusca collected around Portsalon, co. Donegal, Ireland, 1893; and T. D. A. Cockerell on Climate and the Variation of Slugs, June, 1893.

From the respective Societies: Abstract Proceedings of the Linnean Society of New South Wales, 31st May, 1893; and Annual Report for 1892 of the Manchester Microscopical Society.

From the Editor: L'Echange Revue Linneenne for March, April, and May, 1893.

Donations to Collection announced and thanks voted:

From Mr. J. E. Cooper: *Tapes aureus*, *Haliotis tuberculata*, *Clausilia perversa*, and *Chiton marginatus* from Guernsey; *Tellina crassa*, *Tapes virgineus* var. *sarniensis*, *Venus verrucosus*, *Tapes pullastra*, *Patella vulgata*, *Trochus umbilicatus* var. *agathensis*, *T. xizyphinus* with double operculum, *Phasianella pulla*, *Lacuna pallidula*, *Loripes lacteus*, *Trochus exasparatus*, *Murex aciculatus*, *Helix pisana*, *H. acuta*, and *H. virgata* from Jersey; *Psammobia vespertina*, *Fissurella græca*, and *Rissoa cancellata* from Herm; *Trochus lineatus* from La Rocque, Jersey; *Pectunculus glycymeris*, *Solenensis*, and *S. vagina* from Grouville Bay, Jersey; *Dentalium tarentinum* and *D. entalis* from Shellness, near Deal, Kent East; *Hydrobia ulvæ* from Aldeburgh, Suffolk; *Assimineæ grayana* from Purfleet, Essex; *Planorbis lineatus* from Barnes, Surrey; *Pl. carinatus* from Finchley, Middlesex; *Paludina vivipara*, *Anodonta cygnea*, and *Unio tumidus* from the bathing-pond at Hampstead, Middlesex; and *Helix pisana* var. *alba* from St Sampson's Bay, Guernsey.

From the President (Mr. P. B. Mason): Numerous examples of *Helix ericetorum* and varieties, and of *H. nemoralis* from the Irish Isle of Aran, and of the last-named from Bundoran, Ireland; also several shells from the collection of Revett Sheppard, including *Helix cantiana* and *H. hispida* from France; *H. candidissima* and *Clausilia bidens* from Sicily; *H. cornea* from Austria; *H. unidentata* from the Swiss Alps; *H. ventricatus* from Bengal; *H. cingenda* (*H. rhodostoma*) from Tripoli; *Turbo juniperi* from Switzerland; Draparnaud's *Turbo tridens* from Mont Blanc; foreign examples of *H. terrestris*, *Bulimulus trifasciatus*, *Stenogyra decollata*, *Theodoxus mutabilis*, *Bulimulus radiatus*, *Helix circumata*, *H. detrita* and *H. obvoluta*, without locality; the labels and names apparently in the writing of the Rev. R. Sheppard.

New Members Elected:

Mr. John Roseburgh, 54, Market Street, Galashiels, N.B.

Mr. Charles Edward Wood, 41, Darlington Street, Wolverhampton.

Paper Read:

A short note by Mr. J. E. Cooper 'on '*Helix pisana* in the Channel Islands,' and illustrated by shells presented to the collection [to be printed in a future Number].

Exhibit:

On behalf of Mr. Percy Lund was shown an example of the var. *cellaria* of *Limax maximus* from Bradford.

216th MEETING, WEDNESDAY, SEPTEMBER 6th, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-President, in the Chair.

Donations to the Library announced and thanks voted: From the respective Editors: The Naturalist and Feuille des Jeunes Naturalistes for August and September; L'Echange Revue Linneenne for June; and British Naturalist for September, 1893.

From Mr. L. E. Adams, B.A.: On the species of Helicidae found in Japan, by Arthur Adams (June 1868).

From the respective Societies: Transactions of the Royal Society of South Australia, Vol. XVI., Part 2, and Vol. XVII., Part 1 (June, 1893); Proceedings of the Linnean Society of New South Wales, Vol. VII., Parts 3 and 4 (March and May, 1893); and Abstract Proceedings of the same, June 28th and July 26th, 1893.

From the Trustees of the Australian Museum, Sydney: Report for 1892; and the Third Part of Brazier's Catalogue of the Marine Shells of Australia and Tasmania, dealing with the genus *Murex*, 1893.

Donations to Collections announced and thanks voted.

From Mrs. J. Fitzgerald: Marine Shells collected at Viareggio, Italy, viz.:—*Tornatella tornatilis* L., *Donax trunculus* L., *D. semistriatus* Poli, *Turritella communis* L., *Pandora inaequalis* L., *Ianthina nitens* Menke var. *minor*; *Nassa mutabilis* L., *Tellina nitida* Poli, *T. incarnata* L., *T. pulchella* Lamk., *T. (Maconia) cumana* Da Costa, *Ceratisolen legumen*

L., *Solen vagina* L., *Dosinia lupinus* Poli, *Ostrea stentina* Payr., *Mactra corallina* L., *Venus gallina* L., and *Natica iosephina* Recl. var. *egyptiana* Recl., all represented by fine examples.

From Mr. J. E. Cooper : Several examples of *Truncatella truncatula* Dp., from Bawdsey Ferry, Suffolk, with a note that although dead the specimens were quite fresh, and must have lived in the river (the Deben); also a number of *Hydrobia ulva* from the same locality.

Candidate Proposed for Membership :

Dr. James Clark (proposed by Mr. W. Denison Roebuck, F.L.S., and Mr. William Nelson).

Decease of Member.

The death of Mr. James William Davis, F.S.A., F.L.S., F.G.S., Mayor of Halifax, on July 20, 1893, was announced, and the Secretary requested to convey to the family an expression of the Society's sympathy.

Paper Read :

A paper by Messrs. J. G. Milne and Charles Oldham, on 'The Molluscan Fauna of the Bowdon District of Cheshire,' which had previously been read before the Manchester Branch, was read [and will be printed in a forthcoming number of the 'Journal of Conchology'].

Exhibits :

The Chairman exhibited a specimen of *Hyalinia nitida* var. *albida* from Clonmel, collected by Rev. A. H. Delap, and read a short note on its occurrence.

Mr. W. Denison Roebuck, F.L.S., exhibited a small specimen of *Limax cinereo-niger* var. *maura* which he had taken in Roppa Plantation, Bilsdale, York N.E., on the 20th August.

Mr. Henry Crowther, F.R.M.S., then gave a microscopical demonstration of points in the biology of *Spharium corneum*, which anchors itself to bits of water-weed or to the sides of the glass by means of molluscan threads for a week or two at a time. In this position the incurrent and excurrent siphons and the foot are extended. The extension of the foot is striking, since this organ is usually an organ of locomotion. Microscopical examination demonstrates that the primary use of the foot in *Spharium*, and probably in near-allied genera, is no longer for the progression of the animal, but for the procuring of food, by means of a ciliated ectoderm, which is developed on the foot. The cilia of the tip are especially long, the movement being incurrent, i.e., the cilia carry food and air to the gape of the shell, whence they are carried by other ciliated areas over the gills and to the organs of alimentation. As he trusts to embody in a paper other facts of some malacological interest to conchologists about this mollusc, he wishes merely to put on record here the fact that we have in *Spharium* a transitional stage in the use of the foot, which is now primarily a feeding organ, a ciliated arm; and, secondarily, an organ of locomotion, used occasionally when the animal wishes to seek fresh feeding ground.—W.D.R., Hon. Sec.

ADDITIONS TO 'BRITISH CONCHOLOGY.'

BY J. T. MARSHALL.

(Read before the Conchological Society March 1, 1893).

In view of the publication of a new edition of Mr. Somerville's List of British Marine Shells in the near future, it is desirable to place on record descriptions of such new species and varieties as have been found since that gentleman issued his List in 1886, the best of its kind published up to that date. Some of the varieties appeared in that List as MS., and, while a few of them have since been described, there are still some that await description, together with other varieties and a few species which do not appear in that List.

In introducing doubtful species as British, I think it best to state simply the grounds on which they are proposed, and leave it to individual collectors to follow their own discretion as to adopting or rejecting them. I do not presume to impose my *dicta* upon any one.

I do not propose to include any of the species obtained in the 'Lightning,' 'Porcupine,' and other deep-sea Government expeditions, except where there is evidence of the shell having been also found in private dredgings actually on our coasts, though Jeffreys says of the 'Lightning' cruise—'Some of the localities may be considered British, being much nearer Scotland than Faroe.' For although many of the 'Porcupine' dredgings were off our coasts, they were mostly at depths which preclude their ever being obtainable by private enterprise, and it is almost useless to load our List with names of species that may never be acquired by collectors.

In a second paper I propose to enumerate the *changes in nomenclature* which have *become absolutely necessary*. These will be few, for it is to me an important consideration how far we ought to conserve our standard authorities while making gradual

and necessary changes to meet the just claims and recognition of others. Moreover, I do not think it advisable to advocate changes so sweeping as would result in their being ignored altogether.

I think it unfortunate, to say the least, that a new list of the Land and Freshwater Mollusca should have been recently issued under the authority of the Conchological Society, involving innumerable changes and unnecessary additions, without any apparent consideration being given to the question whether those changes would commend themselves generally to the large body of members, and were likely to be followed or not. Old collectors are certainly not likely to disorganise their collections in so wholesale a manner, with the apprehension that, before they have finished, another list may be compiled superseding the present one, and containing as many or even more changes.

This has been done, too, simultaneously with the publication of a Revised List by Dr. Norman, the President of the Society, the changes in which should have been sufficient to satisfy any reformer; but this would not matter so much were they decently in accord, instead of being, as they are, considerably at variance both in arrangement and in nomenclature.

Again, immediately after this 'Official List' in the Journal, appears another 'Revised List' of Slugs, in which a promise (or should I say a threat?) is held out that the writer's 'researches have led to some opinions different from those usually held, and if correct will necessitate a considerable revision of the nomenclature.' Now, where is all this to stop? It is time to speak plainly. We have our standard authorities to go by, and these should be loyally followed until superseded by a successor, except in cases which are obviously wrong. The nomenclature of the land and freshwater mollusca has been getting into a chaotic state for several years past, which the new list rather aggravates, and I think pains should rather have been taken to bring matters back to a sounder basis, than to repel by a bewildering confusion.

I say nothing against the compilers of this official list, who obviously have taken great pains and given much time to it. If published in their own names, and as their own list, there would be little to object to; but it is no light matter for the Society, as such, to impose these wholesale alterations on those who have formed their collections, and who do not care to go to school again. Such fundamental changes are the despair of naturalists, and if followed would necessitate every collection in the kingdom being periodically pulled to pieces and reorganised.

The following are the proposed additions:—

Crania anomala var. **alba** Jeff. Shell white. This was published in the 'Appendix to British Conchology,' but omitted by error from Mr. Somerville's List.

Anomia ephippium var. **squamula** L. Indicated by Jeffreys in 'B. C.,' but not described.

A. ephippium var. **aculeata** Müll. Indicated by Jeffreys in 'B. C.,' but not described.

A. ephippium var. **cylindrica** Gmel. Indicated by Jeffreys in 'B. C.,' but not described.

Pecten aratus Gmel. Living specimens were procured in the 'Triton' cruise (1882) between the Hebrides and Faroes, in 530 fathoms. Also, 'North of Hebrides, 530 fathoms (Carpenter and Thomson); the 'Lightning' cruise, 1868; East Shetland, an imperfect valve (Barlee); Runnelstone Lighthouse, off Land's End, another valve (Hanley); west coast of Ireland, 340 fathoms, another valve, semi-fossil (Hoskyns).—'British Conchology,' vol. ii., pp. 64—5; vol. v., p. 167.

Although the latter instances afford very slender evidence of this species living in our seas, the former would indicate that it only wants searching for to establish its position even to those who consider the 'cold area' between the Hebrides and Faroes forbidden ground to English collectors. And this opens up the moot point—what is the British zone? For the purposes of this paper, at any rate, I consider that the British area extends

half-way to Faroe, and as the above dredgings were nearer our coast than to the Faroes, it follows that this should be recognised as a British species. It does not settle the point to say that it is a 'cold area' and has an arctic or semi-arctic fauna. It is either in British waters or it is not. And if we had a 'cold area' between England and Ireland, or between England and the Channel Islands, English naturalists would claim the fauna of that area, arctic notwithstanding. This is a noteworthy point, as it affects other species besides the present one.

A short description of the shell appears in 'B. C.,' vol. ii., p. 64, under the synonym of *P. sulcatus* Müll., and a good figure is given in Jeffreys' Supplementary Plates, as well as in Sowerby's Index.

P. opercularis var. *audouinii* Payr. Differs from the type in having three rows of prickles or imbrications—one on the summit, and another on each of the sides. It is also a longer shell proportionally. An excellent figure is given in Sowerby's Index. Guernsey, rare.

P. vitreus Chem. Described in Appendix to 'B. C.,' and figured in Supplementary Plate, but for some reason not included in Mr. Somerville's List. Besides a valve found by Dr. Edmondston in Shetland, it has also been taken between the Hebrides and Faroes in 530 fathoms.

Mytilus edulis var. *flavus* Poli. Shell straw coloured, and smaller. Found by Miss Hockin at Newquay, Cornwall, on floating wood. This is the variety named in Somerville's List var. *pallida* Marsh. MS.; but Poli long ago described a light-yellow form as var. *flavus*.

M. modiolus var. *gigas* Norm. I find this varietal name in 'Museum Normanianum,' but do not know if it has been described. It is quite applicable, however, to our large Dogger Bank form, which sometimes exceeds nine inches in length.

M. modiolus var. *cylindrica* Marsh. Smaller, of a more equal breadth throughout, the margin being less prominent

on the hinge-line, and pouting on the ventral side, with the valves more convex. Dredged off Guernsey in 18—20 fathoms. This variety somewhat approaches a *Lithodomus* in shape.

M. barbatus var. **depressa** Marsh. Shell narrower at the anterior and broader at the posterior end, corresponding with the var. *ovata* of *M. modiolus*, and found in similar situations, wedged in the crevices of rocks between tide-marks. Herm Island (J. T. M.); Gouliot Caves, Sark (Jeffreys); Jersey, rock-pools and crevices of rocks (Durey). It derives its peculiar shape from becoming in an early stage of growth wedged in the crevices of rocks, which contract the umbones and prevent development in that part, while giving free play for expansion at the opposite end.

Nucula nitida var. **radiata** Marsh. Shell having coloured rays. Found with the type.

N. nitida var. **turgida** Marsh. Shell more triangular, and umbones more swollen. 'Annals,' December, 1875. Dr. Jeffreys described in the 'Annals' for 1879 a var. *ventrosa*, 'swollen and smooth,' from the Mediterranean, which I take to be the same thing.

Pectunculus glycymeris var. **pilosa** L. Mentioned in 'B. C.' by Jeffreys, but not formally described.

P. glycymeris var. **decussata** Turt. Mentioned in 'B. C.' by Jeffreys, but not formally described.

P. glycymeris var. **nummaria** Turt. Mentioned in 'B. C.' by Jeffreys, but not formally described.

Arca obliqua Phil. This species does not appear in Somerville's List; but as Jeffreys described and figured it upon what he thought sufficient grounds, it would be well to let it keep its place in the British List tentatively.

Arca nodulosa Müll. Mr. Frank Coulson, of Glasgow, dredged a living specimen off East Shetlands in 1886.

Jeffreys also records a valve from Shetland and another from the Orkneys ('B. C.,' vol. ii., p. 180). It was also taken in the 'Porcupine' and other expeditions off the coast of Ireland, Shetlands, and North of Hebrides.

Montacuta donacina S. Wood. There is no doubt of this species living in our seas, but for some unaccountable reason it appears difficult to get at. As long ago as 1839 Jeffreys found a valve at Falmouth, then another in the Shetlands in 1868, and I found a third in Torbay in 1890. The latter valve is as perfect and fresh as if only just vacated by the animal. I should not be surprised if it proved to be a parasitic species. References to it will be found in 'B. C.,' vol. ii., p. 216; vol. v., p. 178, and it is figured in the Supplementary Plates. A valve was taken in the 'Porcupine' cruise at Lough Swilly, and M. Joly has obtained a living specimen off Algiers.

M. bidentata var. **triangularis**. Jeffreys makes reference to this variety in some of his lists, but I do not think he has described it. It is triangular instead of rhomboidal, and I have it from Torbay, Milford Haven, Skye, Aberdeen, Dornoch Frith, Shetland; also from Dröbak, Norway, 60—100 fathoms.

Cypricardia lithophagella Lam. See 'B. C.,' vol. ii., p. 263; vol. v., p. 180, and figure in Supplementary Plates.

Cardium aculeatum var. **depressa** Marsh. Shell depressed, and expanding at the sides. Occasionally found with the type in South Devon.

C. tuberculatum var. **suborbicula** Marsh. This variety is also depressed, and has a rounded instead of an oblique outline. Found with the last. Probably these two varieties are generally diffused with the types. I have named them so that they may take a corresponding position to similar varieties of most other species of *Cardium*, as I think they deserve.

- C. papillosum** var. **obliquata** Monterosato. Shell more globular and oblique. Mediterranean. I have this variety from Guernsey, 18 fathoms.
- Venus gallina** var. **alba**. Mr. Somerville has inserted this in his list for the pure white form.
- Psammobia tellinella** var. **lactea** Marsh. Shell milk white. Found with the type, but scarce.
- P. tellinella** var. **purpurea** Marsh. Uniform purple. Found also with the type, but more plentifully than the white variety.
- Donax vittatus** var. **cuneata** Marsh. Shell having the posterior end wedge-shaped (as in *Psammobia ferroënsis*) instead of obtusely pointed, and more or less gaping. Found occasionally in Torbay.
- D. vittatus** var. **albida** Marsh. Milk white under a straw-coloured epidermis. Occasionally found with the type. The young are often white, acquiring their colours as they become adult ; but some never become coloured.
- Mactra solida** var. **intermedia** Jeff. This is intermediate between the type and the var. *elliptica* (Jeff. in 'Proc. Zool. Soc., 1881, p. 923). It is not uncommon at Scilly, Tenby, and other places.
- Scrobicularia alba** var. **oblonga** Marsh. Shell of the shape and size of *S. nitida*, but having all the other characteristics of *S. alba*. Guernsey and Torbay, rare.
- S. longicallus** Scac. The supposed large *S. alba* found by Jeffreys in the Shetland seas, and mentioned in 'B. C.,' vol. ii., p. 441, as 'about an inch in breadth and of proportionate length,' belongs to this species. It differs from *S. alba* in being 'larger, thinner, and more compressed, not so oval, somewhat flexuous at the posterior end; cartilage and pit longer and narrower, lateral teeth much longer' ('Lightning' Report, p. 926). It was also dredged in the Little Minch during the 'Porcupine' cruise. It is figured in Sowerby's Index, but not satisfactorily ; it should

be more triangular in outline, the shell being longer and the beaks more central and acute.

Saxicava rugosa var. **cylindrica** S. Wood. Extremely broad one way and narrow the other, of an equal depth throughout, corresponding to a similar variety of *Mya binghami*. I have met with this at Guernsey, Land's End, Torbay, and Lamlash, but it doubtless occurs in other places. Its peculiar cylindrical shape is caused by occupying the deserted tubes of serpulæ. Malm has also found it 'in the burrows of *Limnoria lignorum*' ('B. C.,' vol. ii.) Searles Wood described it from the Red Crag.

The variety *minuta* should be expunged from the list. It is synonymous with the var. *arctica*.

Teredo megotara var. **subericola** Jeff. Described by Jeffreys as *T. subericola* in the 'Annals' for August, 1860, but afterwards identified as a dwarf form of *T. megotara*. It lives exclusively in floating pieces of cork, and is sufficiently remarkable to be retained as a variety. (See 'B. C.,' vol. iii., pp. 178—9.)

Cadulus jeffreysi Monte. The species described by Dr. Jeffreys as *C. subfusiformis* in the Appendix to 'British Conchology' was afterwards stated by the Marquis de Monterosato to be not that species, and he re-named it *Helonyx jeffreysi*. *Cadulus* of Philippi is, however, prior to *Helonyx* of Stimpson, and the former generic name prevails. On searching over his specimens Dr. Jeffreys found one *C. subfusiformis*, however, and although a single specimen is a slender claim to rank as a British species, there is no doubt that both live together, and will be found in the locality indicated. Dr. Jeffreys dredged *Cadulus* only once, when they came up rather plentifully. *C. jeffreysi* has also been dredged in the 'Porcupine' cruise in the Shetlands and off Valentia.

Chiton scabridus Jeff. (For description of animal and shell see the 'Annals' for July, 1880.) I found this

species more than twenty years ago in the little island of Herm, in company with *C. cancellatus*, but did not note its specific difference until Mr. Duprey made it known. I subsequently found it in Guernsey and Jersey, and in one or two places in S. Devon. It is gregarious, and I have taken as many as thirteen under one stone, besides young. It is not rare at Guernsey and Jersey, where it seems to affect certain limited spots, and where one or two may be found under almost every stone. The animal is flesh pink, not blood red as stated by Jeffreys, and they attach themselves very slightly underneath stones. The plates are very thin and brittle.

Tectura testudinalis var. **pallida** Verk. Colour whitish, except the centre or dorsal scar, which is reddish brown. Occurs sparingly with the type.

Fissurella græca var. **gibba** Jeff. Named by Jeffreys in his Appendix, and figured but not described. It is smaller, thicker, more tumid, higher proportionately, the sculpture is finer and more equalised, and it is less expanded behind, giving the shell a more oblong appearance. Guernsey and Herm.

Calyptræa chinensis var. **spirata** Nardo. Smaller and more conical, with an acute apex. I have dredged this off Portland Breakwater in eleven fathoms, where it is not uncommon, and it doubtless occurs in other places. It derives its peculiar form by adhering and shaping itself to the whorls of *Turritella terebra*. Dr. Jeffreys, in the 'Lightning' Report, gives this name to a variety of *Crepidula unguiformis*, but Monterosato and others make it a variety of this species.

Cyclostrema millepunctatum Friele. (See 'Conchologist,' vol. ii., no. 6, in which Dr. Chaster records the discovery of two specimens from the Isle of Man). Dr. Chaster has subsequently dredged three more specimens at Oban, and on sending me an example I recognised it as a shell I had

dredged off Southport in twelve fathoms with *Philine nitida*. A live *P. nitida* was also dredged in the Isle of Man with the *Cyclostrema*. The Southport specimen is twice the size of the Oban one sent me, but is nevertheless a very small object, about the size of our *C. nitens*. It differs from the British *Cyclostrema* in its microscopic sculpture, and especially in having the base keeled somewhat like *Adeorbis*, in this respect resembling the *C. excavata* and *C. sulcatum* of Watson, species taken during the 'Challenger' expedition.

Trochus magus var. **conica** Marsh. Shell more simply conical, having a raised spire, the whorls more compressed, the suture much shallower, and the umbilicus smaller. Herm Island, several specimens.

T. tumidus var. **minor** Norman. I note this variety listed in 'Museum Normanianum,' and take it to represent the southern form, which is usually half the size of the northern one. It has its counterpart in *Pleurotoma costata*, and its northern representative var. *coarctata*. Jeffreys' dimensions of one-third-of-an-inch is for the northern form, while the var. *minor* is one-quarter-of-an-inch.

T. cinerarius var. **pallenscens** Duprey. See 'Annals' for March, 1883.

T. umbilicatus var. **pallens** Duprey. See 'Annals' for October, 1876.

Lacuna puteolus var. **plicata** Marsh. This must be expunged from the List. Further specimens convince me that its peculiar sculpture—fine transverse plated ribs—is caused by the want of homogeneity in the structure of the shell, and the consequent irregular wearing away of its surface. *Lacuna pallidula* has the same tendency.

Lacuna pallidula var. **naticiformis** Marsh. Smaller and thinner, rounded in outline; body-whorl globular, and not expanded in any direction; spire prominent and pointed, but short, projecting beyond the outline of the shell.

Guernsey, at low water, on some off-lying rocks. It has its white representative. The shell resembles in shape *Natica montacuti*.

Rissoa striatula var. **varicosa** Marsh. Having one, two, and rarely three prominent ribs on the body-whorl. Found occasionally with the type.

R. parva var. **semicostata** Mont. Only half ribbed. Not noticed by Jeffreys, but quite worthy of a varietal name. Var. *semicostata* is somewhat of a misnomer, as all typical specimens have three smooth upper whorls and three ribbed lower ones ; but in this variety the bottom whorl is smooth.

R. striata var. **distorta** Marsh. Shell more or less distorted out of its normal axis. It is found everywhere with the type. *Rissoa striata* has the faculty of putting on an adult appearance when very small, its mouth and labial rib being fully formed, but when it commences to enlarge its domain it cannot for some reason follow on the same axis, and the renewed growth appears as a dislocation. In every specimen of the var. *distorta* the original labial rib is distinctly visible, and I have never met with an exception. This peculiarity is limited to the type form, however, whether living under stones or in sea-weeds, but it never appears in the var. *arctica*.

Most of the *Rissoæ*, as well as other genera, are occasionally found with a varix on the body-whorl, arising from a fresh start having been made after the formation of the mouth, perhaps owing to improved conditions of climate or food prompting an extension of the body-whorl ; but this species and *R. striatula* are commonly liable to these varices, whatever their cause. Specimens may be found of either species having the mouth and its particular sculpture fully formed, and apparently adult, not one-fourth the normal size, and these would probably remain as dwarfs but for some unknown change giving an impulse to its further growth—in other words, they appear to have the power either to remain dwarfed or to put on a fresh growth.

- R. pulcherrima** var. **pellucida** Marsh. Clear white, with no traces of coloured markings. Found in sea-weeds at Guernsey and Herm, with the type.
- R. cingillus** var. **graphicus** Turton. Straw colour, with faint bands of a darker shade. I think this may fairly be restored to the British List; it is a well-marked variety. It is this form which is so abundant at Weymouth and Lulworth, and not the white one as stated by Jeffreys. Turton gave Weymouth as the locality for his var. *graphicus*.
- Hydrobia ulvæ** var. **minor** Marsh. Much smaller, not exceeding a line in length, and narrower throughout. Found underneath stones, between tide-marks. This variety is exclusively marine, the type living on mud-flats; it also has its white representative. It is very closely allied (much more so than the type) to the *Turbo minuta* of Totten, which inhabits the North American and Canadian coasts.
- H. ulvæ** var. **tumida** Marsh. Shell forming a short cone, with a spire of 4-5 convex whorls, and a necessarily deeper suture, the body-whorl being abnormally large, with no trace of a keel. Found at Skegness and Dornoch Frith. This variety is analogous to *H. ventrosa* var. *ovata*, for which it might at first sight be mistaken; but the body-whorl is far larger, the suture shallower, and the shell thicker.
- H. ulvæ** var. **decollata** Marsh. Part of the spire decollated and plugged up. From Killala Bay, Sligo, west coast of Scotland, and other localities. In the first-named locality live specimens are reduced to the two lower whorls only.
- Scalaria pseudoscalaris** Broc. For full particulars see 'Journal of Conchology' for March, 1887.
- Odostomia albella** var. **subcylindrica** Marsh. More elongated and narrower. It occurs rarely with the type in Guernsey and Jersey, but at St. Mary's, Scilly, under stones at low water, nearly half the specimens are of this

variety. It has the dimensions and general appearance of *O. plicata*, but the latter has a stronger tooth which is always visible, and the suture is shallower.

- *O. acuta* var. *gracilis* Marsh. Shell more slender throughout. From Torbay and the Channel Islands.
- O. acuta* var. *attenuata*. Spire much longer and attenuated, suture slighter, whorls more flattened, mouth longer and narrower, and umbilicus smaller. Guernsey, 20 fathoms, rare. Resembles in shape *Eulima distorta* var. *gracilis*.
- O. turrita* var. *nana* Jeff. A minute *fac-simile* of the type. This occurred to me many years ago (1872) from Skye, and was shown to Dr. Jeffreys, who adopted and published the name. I have it also from Millport in Cumbræ, and from Torbay; in all cases living in sea-weeds at low-water. It has also been recorded from the Mediterranean and Teneriffe. There is a dwarf form of *O. turrita* not uncommon which is less than a line in length; but the var. *nana* does not exceed half-a-line.
- *O. plicata* var. *carinata* Marsh. Having a keeled periphery. Habitat: St. Aubin's Bay, Jersey, with the type. About twenty per cent. are so keeled, some of them more strongly than *O. conoïdea*.
- O. insculpta* var. *lævissima* Sars. Shell quite smooth. Habitat: Norway, in deep water (Sars). In this country it occurs at Gairloch in 30 fathoms, and in the Minch 50—70 fathoms.
- *O. diaphana* var. *inflata* Marsh. Shell broader throughout; whorls more convex, the last one particularly so. Resembles *O. insculpta* var. *lævissima*, with which it lives in the Minch, in 50—70 fathoms; but the tooth and umbilicus of the former enable the two forms to be separated without difficulty.
- O. warreni* var. *intermedia* Marsh. Having the oval body-whorl and short spire of *O. obliqua*, but retaining the basal striæ, the umbilicus, and the truncated apex of *O. warreni*.

Found in Torbay; Killala Bay, west coast of Ireland; and in the Minch.

There has been some confusion and mixing-up of *O. warreni* and *O. obliqua*. This should not have occurred, as Clark wrote long ago that 'both animal and shell are very distinct from *O. obliqua*.' The latter is really a rare species, very true to form, and sculptured throughout with spiral striæ, which may be seen with a lens. It is not 'shaped like a miniature *Limnæa stagnalis*,' as Jeffreys states, nor is the spire 'long and tapering'; that applies to *O. warreni*, whereas *O. obliqua* is shaped like a miniature *Limnæa palustris*, and forms a long oval, having a short spire and a long body-whorl. The nucleus is twisted upwards and exposed, while in all its congeners it is sunk. Jeffreys' figure is not very good; there should be no umbilicus, the spire should be shorter, and the last whorl longer. Forbes and Hanley's figure is taken apparently from an *O. diaphana*, which Sowerby seems to have followed, while the latter's figure of *O. diaphana* would do for *O. insculpta* var. *lævissima*, but not this. *O. warreni*, on the other hand, is a comparatively common shell, widely diffused on our coasts. It is also extremely variable in shape, the extreme forms being most marked, and liable to be taken at first sight for different species. Jeffreys' type figure, from the Shetlands, of which I have specimens, is different from any I have from at least twenty other localities, and numbering hundreds of specimens. The shell always has a larger body-whorl than this figure; the whorls are turreted so as to give the spire a telescopic appearance, especially when viewed with the mouth downwards; it is sculptured with spiral striæ at the base only of each whorl, and it has a large and deep umbilicus visible at all stages of growth; the suture is deeper and less oblique, the apex abruptly truncated, and the aperture shorter and wider. It will thus be seen that the two species have very few characters in common. Forbes and Hanley's figure of this is nothing like, neither is Sowerby's. *O. spiralis* var. *coarctata* Marsh. (See 'J. of C.,' Apr. 1891).

- O. pusilla** var. *cylindrata* Marsh. Long and slender, much narrower than the type. Habitat: Jersey; Mount's Bay; Tenby; Aberdovey; off Southport; Dornoch Frith.
- O. pusilla** var. *minuscule* Marsh. (See 'J. of C.,' Apr. 1891).
- O. delicata** Monte. This species was taken during the 'Porcupine' cruise at Bundoran, in Donegal Bay, with *Circulus striatus* (*Trochus duminyi*). I have since obtained it from Roundstone Bay in 12 fathoms, Killala Bay, and Bundoran, on the west coast of Ireland, also at Portrush, Co. Antrim. It is the *Chemnitzia gracilis* of Philippi, but was for sufficient reasons re-named by the Marquis de Monterosato in the 'Journal de Conchyliologie' for 1874, p. 267.

'Distribution: Loire Inférieure, Gulf of Gascony, Mediterranean, from Spezzia to Alexandria, and Adriatic, 18—120 fathoms. Not *Turbo gracilis* of Brocchi, nor *Chemnitzia gracilis* of de Koninck, fossil species of *Odostomia*. The columellar fold or tooth is sometimes observable.' — Jeffreys', in 'Lightning' Report.

It is well figured in Sowerby's Index as *Chemnitzia similima* Mont., and differs from *O. lactea* var. *paullula* in being longer and more slender. See also 'B.C.,' vol. iv., p. 166, under *Chemnitzia gracilis*.

- O. compactilis** Jeff. Described in 'British Conchology' as *O. scillæ* var. *compactilis*, but in the 'Lightning' Report distinguished as a species. In originally describing the shell in 'British Conchology,' Jeffreys has stated 'it may be a distinct species.' Sars has since dredged it in Norway, and named it *Eulimella compactilis*.
- O. ventricosa** Forbes. Described in 'British Conchology' as *O. acicula* var. *ventricosa*. In the 'Lightning' Report Jeffreys has raised it to the rank of a species in deference to the opinions of adverse critics. He says it 'has a more delicate texture, the whorls are more swollen and the suture consequently deeper, and the apex is more attenuated.' Besides having a sharper apex the base is broader,

giving the shell a conical appearance, whereas *O. acicula* is cylindrical, the lower whorls being of the same width. I have never noticed the slightest trace of a tooth in this species, but in *O. acicula* an incipient one is frequently observable. It is not easy, however, to establish its generic rank, intermediate forms occurring which may be ascribed to either; but Jeffreys having once again separated it as a distinct species, the weight of his authority may be taken as having turned the scale. The animal has been described in the 'Appendix to British Conchology.'

Eulima perminima Jeff. ('Annals and Mag. of Nat. Hist.,' June, 1883, & pl. xvi.). After describing the above species, which was dredged 'off Crete, in 70—120 fathoms,' Dr. Jeffreys added that he had detected it among his Zetlandic shells. It therefore forms part of the British fauna. He says it is 'proportionately narrower than *E. philippii*, with a shorter spire and a smaller mouth.' His figure is most unlike any form of *E. philippii*, and if it has been correctly drawn no one is likely to mistake it for that species. It is a very minute shell.

E. ephamilla Watson. (See 'Journal of Conchology,' October, 1890). Since writing that paper I have seen the 'Challenger' specimen. It is a very poor one, slightly broader than mine, approaching more in shape to *E. subulata* of the same size; but the figure in the 'Challenger' Report appears more graceful, and approximate to the British examples. The young are obtusely keeled, and three of my specimens are slightly curved. The apex is unlike any other British *Eulima*. I detected a specimen in Mr. Jordan's fine collection, mixed with a series of *E. philippii* var. *gracilis*, labelled 'Hebrides.' With regard to the locality of the 'Challenger' specimen—Pernambuco—I believe the affinity between the crustacea of S. America and Great Britain has long been known.

E. philippii (distorta) var. tumidosa Marsh. This variety

I had originally named in MS. until the publication of the 'Challenger' Report, when I recognised the *E. latipes* of Watson, described and figured therein, as the same thing, and an article on the subject appeared in the 'Journal of Conchology' for October, 1890. Since then I have compared my shell with Boog Watson's in the British Museum, and in consequence have relegated my specimens back to this variety, to which I consider Dr. Watson's specimens may belong. They are both extreme forms of that species, the Scillonian specimens being the extremest of the two. The curve or dislocation of the spire is a variable quantity. For further particulars see 'Journal of Conchology,' October, 1890. With regard to the change of the well-known name *distorta* for *philippii*, Dr. Watson, in the 'Challenger' Report, has followed some authors in using *E. philippii* Weinkauff in preference to *E. distorta* Defrance. Dr. Jeffreys and some others prefer to retain it. The former considers *E. distorta* DeFr. (an Eocene fossil) to be distinct from the recent species, while in the 'Lightning' Report Jeffreys says—'Judging from the description and figure of the Eocene species in Deshayes' work, I should have been inclined to consider it distinct from the recent species, but having lately received typical specimens of the former, I have carefully compared them with many hundred specimens of the latter, and I feel myself conscientiously bound to unite them. Some specimens of both forms have the last whorl longer in proportion to the next, or else have the outer lip more or less flexuous; the degree of curvature (which is occasionally double or flexuous) differs considerably, and the periphery is now and then somewhat angulated or keeled.'

In 'British Conchology,' however, Jeffreys had previously said—'Although all the colourless *Eulimidae* are much alike,

it must not be forgotten that the fauna of the Eocene period was very different from that which now exists in temperate latitudes.'

However, Dr. Watson says that 'a good deal of confusion has gathered round the nomenclature of this species, and the confusion began with DeFrance,' who confounded his *E. distorta* with another fossil shell from the Miocene and also with the recent *E. polita*. Basterot and Grateloup followed by calling the Miocene shell *E. distorta* = *E. similis* d'Orb. Searles Wood then identified this Miocene shell with the recent one, 'but Deshayes says the fossil one is much larger and quite distinct.' Philippi then applied the name of *distorta* to the Mediterranean shell, which Deshayes subsequently corrected.

After such a bewildering genealogy, it is well that *E. distorta* has been assigned to the Eocene shell, and the name given by Herr Weinkauff in 1867 assigned to the recent one—*E. philippii*.

E. bilineata var. **exigua** Marsh. Dwarfed, about a line in length. It is found everywhere with the type, the latter being of all sizes from one line to three and three-quarters, and is in this respect analogous to *Cerithiopsis tubercularis* and its var. *nana*. In size and shape this variety resembles *E. jeffreysiana* of Brusina, but the mouth of the latter is smaller and the apex more pointed.

Natica catena var. **leckenbyi** Marsh. (See 'Annals and Mag. of Nat. Hist.' for December, 1875.) This may be the var. *castanea* of Lamarck. It is similar to the Red Crag form, and resembles *N. sordida* in outward appearance.

N. affinis Gmelin. The animal of this species was described by Jeffreys in the 'Annals' for April, 1877, and figured in his Appendix as a British shell, I think with sufficient reason. It was dredged during the 'Porcupine' cruise off the Butt of Lewis in 445 fathoms, off Shetland in 345 fathoms, off the S.W. of Ireland in 557 fathoms, and during the 'Lightning' cruise between the Hebrides and Faroes

in 62 fathoms. It has a calcareous operculum, and the umbilicus is closed by a thickened continuation of the inner lip. It has a very wide distribution—'Circumpolar and Arctic seas in the Atlantic and Pacific, Iceland, Faroe, Norway, Labrador, Gulf of St. Lawrence, New England, Siberia, Sea of Okhotsk, Aleutian Isles, and North Japan' (Jeffreys). Like *N. islandica* and *N. grænlandica* this attains a large size in northern latitudes. I have specimens from Nunivak, in the Behring Sea, $1\frac{1}{4}$ in. by $1\frac{1}{8}$ in. The var. *elatio*r of Möller lives in the Faroe Channel.

Aporrhais serresianus Michaud. This species may now be added to the British List, living as it does on the western coast of Ireland and the eastern coast of Shetland. Jeffreys' description of *A. macandreae* may be taken as that of *A. serresianus* except as to size, the former being merely a dwarf form of the latter. *A. macandreae* thereby becomes *A. serresianus* var. *macandreae*.

Cerithiopsis tubercularis var. *albescens* Marsh. (See 'Journal of Conchology' for April, 1891). Scilly and Guernsey.

C. tubercularis var. *scalaris* Monterosato. Shell more conical, whorls turreted as in *Odostomia scalaris*. Scilly Isles, 40 fathoms.

C. tubercularis var. *acicula* Brusina. Shell forming a very slender obelisk, the base not being contracted as in the type, nor do the apical whorls suddenly narrow; tubercles smaller and closely set together; suture slight. Length, 0·2; breadth, 0·04. Scilly Isles, 40 fathoms.

C. concatenata var. *lactea* Marsh. (See 'Journal of Conchology' for April, 1891).

C. metaxæ var. *angustissima* Forb. Longer and slenderer than the type. Scilly, 40 fathoms; Plymouth Sound. My specimens are a quarter of an inch long, and less than half the width of the type.

C. metaxæ var. **alba** Marsh. Milk white. Guernsey, 20 fathoms; Scilly, 40 fathoms.

In the 'Lightning' Report Jeffreys mentions a needle-shaped variety from the Bay of Naples, which is 'slender and narrow,' and another which is milk-white. According to Monterosato, the former is var. *angustissima* Forbes = *benoitiana* Monte. Both these forms are now added to the British List. The Scilly Islands abound in varied forms of the Cerithiopsidæ.

In reading Jeffreys' detailed description of *C. metaxæ*, it should be noted that the species consists of two forms—the one which he describes, having four rows of tubercles on each whorl, these whorls convex and rounded, with a very deep suture; in the other, the whorls have three rows of tubercles only, the fourth row fitting into and filling up the otherwise deep and wide suture, and so entirely altering the aspect of the shell. I am surprised Jeffreys did not notice this very characteristic difference, which should have a varietal name. In about thirty specimens from the Channel and Scilly Islands the two forms are about equally divided.

Purpura lapillus var. **ovalis** Jordan. Spire short and depressed; body-whorl globular; sculpture obsolete. Length, 1; breadth, 0·75. Found at Paignton, S. Devon. Some specimens are almost as broad as long.

P. lapillus var. **gracilis** Jordan.—Spire much longer; body-whorl smaller and narrower; aperture not thickened, nor provided with the usual plications or tubercles; suture very deep; sculpture coarse. Length, 1·5; breadth, 0·75. From Burnham, Somerset. This is like a small and elongate form of the var. *major*.

Cassidaria echinophora L. Two fine live specimens of this species were dredged off the S.W. of Ireland in 1886, in 220 fathoms, and about forty miles from land, by a party of members of the Royal Dublin Society. One of the specimens was presented by the latter body to the British Museum, and the other is in the Dublin Museum.

Buccinum humphreysianum var. **ventricosum** Kiener.

Larger and more ventricose; operculum slightly larger proportionately. I have seen a specimen of this variety in Mr. Jordan's possession from the south of Ireland.

Murex aciculatus var. **elongata** Monterosato. Spire longer and narrower, body-whorl smaller and compressed. Coast of Africa (Monterosato). Herm Island, low water. This variety appears in Mr. Somerville's List as a MS. one of mine, but the Marquis de Monterosato published it in 1880.**Fusus gracilis** var. **belliana** Jordan. (See 'Journal of Conchology' for July, 1890).**F. gracilis** var. **coulsoni** Jordan. (See 'Journal of Conchology' for July, 1890).

Mr. H. K. Jordan, F.G.S., in his very interesting paper on the 'Genus Fusus,' in the number of the Journal above quoted, has proposed the introduction of nine more species of Fusus into the British List—species found by various Government expeditions, and most of them represented by a single specimen only. For the reasons given in my preface I do not propose to enumerate these. While it is instructive to record and interesting to know that certain species live in that part of the ocean surrounding our islands, it appears to me superfluous to load our list, perhaps for all time, with the names of species of which nothing more may ever be generally known beyond the mere name. If these species (and others) had been obtained by private enterprise, and could be considered as obtainable by the ordinary dredger or naturalist, they would come more within the range of practical conchology. As it is, they are almost exclusively museum specimens, and are likely to remain so.

Nassa reticulata var. **minor** Marsh. Much smaller, ranging from two to six lines in length. Not uncommon in Torbay, and probably to be found in other places. My smallest specimens are under two lines in length, and have

the thickened outer lip, tuberculated aperture, and enamelled pillar of the largest. The young of the same size have none of these characteristics, and the base is more or less angulated. The specimen 'from Clark's collection, not half an inch long,' mentioned by Jeffreys, belongs to this variety.

Defrancia linearis var. **alba** Marsh. Pure white. Guernsey, 20 fathoms; Scilly, 40 fathoms; Land's End. Rare.

Pleurotoma costata var. **coarctata** Forbes. I know of no reason why Jeffreys did not recognise this variety. It inhabits our northern coasts, and is double the size of the southern form, with a longer and more tapering spire. It is described and figured in Forbes and Hanley's work. Jeffreys' description is taken from the northern form, judging from the dimensions he gives; this averages four lines in length, and the southern form two-and-a-half lines.

P. nebula var. **fusiforme** Marsh. Shell larger, the same length as the var. *elongata*, with a shorter spire and longer body-whorl; colour ashen-grey, with streaks of pale-brown between the ribs; these ribs are inconspicuous, almost disappearing on the body-whorl; spiral sculpture finer, and uniform; suture much shallower. In shape, sculpture, and proportions, this is more like *P. lavigata* than *nebula*, but it has not the characteristic strap-like band encircling the upper part of the whorls. In the 'Annals' for December, 1875, I referred this variety to the var. *elongata*, as from the Doggerbank, in 40 fathoms; but that variety has a long spire and short body-whorl, the reverse of this, besides other differences enumerated above. I have it also from the Minch in 30 fathoms.

P. rufa var. **prælonga** Marsh. Spire much produced; whorls 9; ribs slight or altogether absent, especially on the lower whorls. Length, three-quarters of an inch. Guernsey, 20 fathoms, rare.

P. rufa var. **ecostata** Marsh. Colour ash-grey; spire shorter; body-whorl longer and compressed; ribs obsolete, except just below the suture, which appears shallower in consequence of the whorls being but slightly angulated. This variety was dredged by the surveying ship 'Porcupine' in the Lynn Deep, on the Norfolk coast, in 40 fathoms, and are in my collection. It is analogous to *P. nebula* var. *fusi-forme*, which it resembles in several particulars. It also approaches very closely to *P. pyramidalis*, a post-tertiary fossil sometimes dredged in our seas; but that has fine and regular spiral striæ, while this is unequal and irregular.

Cypræa europæa var. **minor** Marsh. Shell very much smaller, measuring 2 lines by $1\frac{1}{2}$. From deep water off Guernsey; west coast of Ireland; Barra, 40 fathoms.

C. umbilicata var. **strigella** Loven. Larger, with coarser spiral striæ. It is figured in Forbes and Hanley's work, and in Sowerby's Index. I can verify this variety from Stornoway only. Jeffreys' figures of *C. umbilicata* and *C. nitidula* are misarranged. What he figures as *C. nitidula* is *C. umbilicata*, and *vice-versa*, while the section showing the spiral sculpture of *C. umbilicata* has been attached to the figure of *C. nitidula*. This derangement is doubly unfortunate, as these two species are rather difficult to discriminate.

Cylichna ovata Jeff. This was described in 'British Conchology' as *C. umbilicata* var. *conulus* S. Wood, but subsequently raised to a species under the above name. It differs from *C. umbilicata* in being oval instead of oblong; it has a wider mouth, is longer, thinner, smoother, more glossy, and the depression in the crown is wide and deep, exposing the whole interior of the inverted spire. There is an excellent figure of it in the 'Challenger' Report. It is also figured in Sowerby's Index as *C. umbilicata* var. *conulus*, but this figure is a form of *Utriculus truncatulus*, somewhat resembling in shape *C. striatula* Forbes, with which *C.*

ovata has sometimes been confused. *C. striatula* is a conical shell with a truncated apex, has spiral striæ at the base, and longitudinal striæ at the apex, and is more solid. (See also 'Annals' for July, 1870).

Acera bullata var **farrani** Norman. The large Connemara form dredged by Dr. Farran, mentioned in 'B.C.' vol. iv., p. 432, has been very appropriately named by Dr. Norman var. *farrani*. This and the var. *nana* he thinks should be 'regarded as entitled to rank as species'; but size has never been considered by itself a specific character, and the range in size of these two forms, though very great, is not exceptional.

Scaphander punctostriatus Mighels. (See the 'Annals' for July, 1890). This is the *S. librarius* of Lovén and of 'British Conchology'; but Mighels' name is prior.

Cryptaxis crebripunctatus Jeff. A new genus and species established by Jeffreys for several specimens of a small *Bulla* taken in the 'Triton' cruise of 1882 between the Hebrides and Faroes, in 570 fathoms. It was described and figured by the author in Proc. Zool. Soc., June, 1883; and Dr. Norman has some notes on it in the 'Annals' for July, 1890. Jeffreys gives the dimensions of his largest specimen as 2 lines by 1; but Mr. Jordan has a still larger specimen from the Faroe Channel, measuring $2\frac{1}{2}$ lines by $1\frac{1}{2}$. It is impossible to say if this is adult—it may be immature. Mr. Jordan's specimen contains the animal, which I hope he will some day describe.

Philine scabra v. **circa** Marsh. (See 'J. of C.' for Apr. 1891).

P. angulata var. **circumlustra** Marsh. Having a broad clear band encircling the periphery. Jeffreys in his description says that 'occasionally one or two transparent zones may be seen'; but I have never met with any deviation from the one broad transparent band. I have this from the Eddystone, 28 fathoms; Tenby, Portrush, Killala Bay, and Sutherlandshire.

P. punctata var. **cingulata** Marsh. Having the same transparent zone across the middle as the last variety. It occurs very sparingly with the type at Guernsey, 20 fathoms; Scilly, 40 fathoms; Sennen Cove, Land's End; Borough Island, S. Devon; Killala Bay; Portrush; Sutherlandshire; Minch off Barra, 53 fathoms. Not the *P. cingulata* of Sars.

Pleurobranchus plumula var. **alba** Marsh. Pure white. Fifty per cent. of my Jersey specimens are white, and it no doubt occurs elsewhere, as Jeffreys states that the shell is 'rarely milk-white.'

Assimineia littorina var. **albida** Sykes. Clear white. Weymouth. See 'J. of C.' for Jan., 1890). Found occasionally with the type at Torquay, Portland, and Weymouth.

SEVENOAKS, TORQUAY,
October, 1892.



Note on *Helix pisana* in the Channel Islands.—

This snail is abundant in some spots close to the sea on the south coast of Jersey. It lives there on the Wild Radish (*Raphanus raphanistrum* L.), and the Wall-flower (*Cheiranthus cheiri* L.), two plants which flourish in the sandy fields near the shore. All the examples of *Helix pisana* found there were typical. Near Vale Castle, in Guernsey, there was a colony of this species on the edge of a cultivated field. These snails were living on a thistle (*Carduus pycnocephalus* L.) and were all very pale in colour, most of them being the var. *alba*. Had the food-plant in this case anything to do with the lack of colour? A thistle, one would suppose to be an uninviting plant to a snail, and just across the road (opposite Vale Castle), there were plenty of Wild Radishes, but no *H. pisana* to be seen on them. Does this snail only live for one season? The examination of about two hundred living examples at the end of May, 1893, failed to produce one shell with the lip fully formed, though many of the dead shells lying about were full-grown.—J. E. COOPER, 93, Southwood Lane, Highgate, N., 20th July, 1893. (Read before the Conchological Society, 26th July, 1893).

THE LAND AND FRESHWATER MOLLUSCA OF
OBAN AND THE ISLAND OF LISMORE.

BY R. STANDEN AND J. RAY HARDY.

(Read before the Manchester Branch, September 14th, 1893).

We visited Oban in the early part of last August, in company with our friends, Mr. W. H. Heathcote, Dr. G. W. Chaster, and Captain W. J. Farrer, for the purpose of doing some marine dredging, and during our stay we devoted several days to the investigation of the Land and Freshwater Mollusca of the district around Oban, and the neighbouring Island of Lismore.

A full day's research to the South, and another to the North of Oban was participated in by the whole party, and another day we two were landed on Lismore, whilst our steamer took the others into the Sound of Mull to dredge, calling for us in the evening. We also made various short excursions in the immediate vicinity of Oban, and searched several valleys and woods along the road to Loch Etive.

The geological features of Oban are at first sight not particularly promising—conchologically. The town stands upon a strip of the old Red Sandstone, which extends on the North along the coast as far as Dunstaffnage, and on the South to Loch Feochan, and our search was confined to this area. The woods are principally pine, which, as all conchologists know, usually indicates barren ground for shells. But behind Oban there are plenty of clumps of other trees, and groves of hazel, and both these and the pine woods are undergrown with a dense coating of moss, etc., kept damp in many places by the trickling of water from the cliffs, and such places yielded a fair number of species to our close search.

The Island of Lismore is entirely composed of a hard metamorphosed limestone, and we searched it with a particular interest. It was one of the early Christian settlements, and as its sheltered valleys were brought into a high state of

cultivation by the industry of the 'monks of old,' the effects of which are still noticeable, it seemed to us extremely likely that the introduction of foreign garden and other plants might have led to the colonization of species of mollusca alien to the locality. The day chosen for our visit was not very favourable to the finding of land shells, being extremely hot, and but for a heavy thunderstorm and fall of rain on the previous night, which had thoroughly soaked the ground, we should certainly have found but little. As it was we were fairly successful in obtaining a good many species, but were somewhat disappointed at not finding *Helix aspersa*, or *Helix hortensis*, which might very reasonably be expected to occur on the island.

There are several small freshwater lochs and streams on Lismore, but the former are mostly deep and clear, with scarcely any aquatic vegetation suitable for molluscan life, and yielded but little to the cursory dips of the dredge which our limited time permitted. Lochan Dubh, a lovely little lake on the road between Oban and Loch Etive was very closely searched, but although a luxuriant growth of waterlilies and bullrush fringed its margin and looked very promising, we found that it had a peaty bottom, and contained only a few species in limited numbers. Both Lochan Dubh, and the lochs on Lismore are the resort of numerous gulls, wild ducks, and other waterfowl, which breed on their margins, and the presence of these, and their broods of hungry young, doubtless accounts to a great extent for the scarcity of mollusks. The streams examined were equally barren, with one exception, a small brook at Ardbhan Craigs, abounding with *L. peregra*, so that our record of freshwater shells is a very meagre one.

Mr. Thomas Scott, in a paper 'On the Land and Fresh-water Mollusca about Tarbert, Loch Fyne' (see 'Journal of Conchology,' vol. v., p. 72) agrees with us in his observations respecting the scarcity of the freshwater shells. His list will be

found extremely interesting, as his hunting-grounds lie comparatively near our own, and he records four species we did not get, viz. :—*Arion subfuscus*, *Hyalinia excavata*, *Helix aspersa*, and *Ancylus fluviatilis*.

The following list of species found is not without interest, and whilst affording a fairly good general idea of the Molluscan Fauna of the district examined, will also serve as a useful basis for future collectors to work upon :—

Arion ater L.—Common wherever we searched in the Oban district, and showing a most remarkable variation in colour. Brown, reddish, slaty-grey, yellowish, and beautiful pink or lilac varieties were not uncommon. On Lismore, though equally plentiful, none but jet-black examples were found, and these chiefly under dried cowdung or sods on sides of ditches.

A. hortensis Fér.—A few in the pine woods at Ardbhan Craigs. Much more plentiful on Lismore, at the base of garden walls, and near some old ruins.

A. circumscriptus Johnst.—Far more common throughout the Oban district than the preceding species. Only one specimen was found on Lismore.

Limax maximus L.—A few medium-sized specimens occurred in a wood behind Oban Railway Station, and one on an old garden wall on Lismore.

L. marginatus Müll.—Very abundant on elms and beeches in woods behind Oban Station, chiefly in tufts of *Orthotrichum phyllanthemum*, which grows luxuriantly on the trees. The trunks of the trees were covered with their slime-tracks in many cases as far up as one could see. Mr. Heathcote climbed to the topmost branches of a very tall elm, and found the tracks all the way up, extending along the outlying branches, and came across many of the slugs hiding in the crevices of the bark. A few were found under stones at Ardbhan Craigs, but none on the pine trees. Only one was found on Lismore, under a fallen tree.

Agriolimax agrestis L.—Rather rare, both at Oban and Lismore. All seen were variety *sylvatica*.

A. lævis Müll.—Not uncommon in damp situations at Ardbhan Craigs; in woods on road to Loch Etive; and about Dunollie Castle. On Lismore it is remarkably abundant, occurring everywhere in damp places, and is by far the commonest slug on the island.

Vitrina pellucida Müll.—Occurs sparingly in woods at foot of Ardbhan Craigs and behind Oban station; also on the banks of Lochan Dubh, and several places on Lismore. Mostly dead shells, and very small in either locality.

Hyalinia draparnaldi Beck.—A few good examples under logs close to Dunollie Castle.

H. cellaria Müll.—A few in woods behind Oban Station; at Ardbhan Craigs, some nice specimens were found; but about Dunollie Castle it is small and scarce. Very abundant in many places on Lismore, chiefly at foot of damp walls and rocks.

H. alliaria Miller.—Fairly common all around Oban, and also on Lismore, where it approaches *Hyl. glaber* in form. Several specimens of variety *viridula* Jeff. were taken in the pine woods, South of Oban.

H. nitidula Drap.—Not uncommon to South of Oban, and a few near Dunollie Castle. A specimen of variety *Helmi* Alder, was found at Ardbhan Craigs by Dr. Chaster. The type is plentiful in many parts of Lismore.

H. radiatula Alder.—Rather plentiful in a damp spot near the "Dog Stone"; a few on roadside at Ardbhan Craigs, and in a little valley on the road to Loch Etive amongst damp moss on the side of a small brook. Several taken on Lismore, near Kilcheran.

H. pura Alder.—Near Lochan Dubh; in pine woods at Ardbhan Craigs; and in two localities on Lismore. The type and brown variety in about equal proportions, except on Lismore where the brown variety only occurred.

- H. crystallina** Müll.—Taken very sparingly about Oban; common at Ardbhan Craigs; all very small and compact in form (var. *contracta* Westl.). On Lismore it is plentiful and very much larger.
- H. fulva** Müll.—Not uncommon throughout the Oban district. Plentiful, and unusually large on Lismore.
- H. nitida** Müll.—A few fine specimens on shores of Lochan Dubh, close to the water's edge. Fairly common on wet rocks on Lismore.
- Helix rotundata** Müll.—Not uncommon to the South of Oban, but rare on the North Side, where, however, some unicolourous specimens were taken—a variety we have not observed before (var. *rufula* Moq.?). Several specimens of variety *alba* Moq. were found under moss-covered stones at Ardbhan Craigs. On Lismore the type is abundant, very large, and prettily marked.
- H. pygmæa** Drap.—A few amongst moss and on dead sticks between the "Dog Stone" and Dunollie Castle; and amongst moss on Lismore.
- H. lamellata** Jeff.—Several specimens from a pile of moss-covered debris which had fallen from the cliffs at Ardbhan Craigs. They are very small but adult, and much eroded at the apex.
- H. aculeata** Müll.—Common in the pine woods at Ardbhan Craigs, under stones; several specimens of variety *albida* Jeff. taken on a fungus-covered rail. A few amongst dead sticks around Dunollie, and under dead branches in several parts of Lismore.
- H. pulchella** Müll.—Scarce. Two dead shells near Dunollie, and a few alive at Ardbhan Craigs, all type. On Lismore it is more plentiful, but all we found were variety *costata* Müll.
- H. nemoralis** L.—Not uncommon about Oban, and on Lismore. Some very richly-coloured and unusually banded forms occur in both localities. The hot weather had driven

the animals for shelter under stones and into rock crevices, and it required much labour to get at them in their retreats.

- H. hortensis** Müll.—Scarce. A few weathered specimens near Dunollie Castle, and on road to Loch Etive were all we noticed.
- H. arbustorum** L.—Very fine in woods behind Oban, and near the Manor House. Mostly a very dark coloured and high spired form. Mature specimens were very scarce, but young shells occurred in profusion. On Lismore we took one solitary specimen—variety *marmorata* Taylor—amongst nettles at foot of an old wall.
- H. rufescens** Penn.—A dark compact form was fairly common about Dunollie Castle. One specimen of variety *alba* Moq. was taken at Ardbhan Craigs, but the type was not seen in this locality. On Lismore it is rather scarce, typical in form, and very large.
- H. hispida** L.—Very rare, only a few of the type were found, close to Oban.
- H. sericea** Jeff.—The commonest *Helix* found throughout the Oban district; also on Lismore, where it is remarkably fine. Both type and var. *cornea* Jeff.
- H. ericetorum** Müll.—Plentiful on the island of Lismore, but we did not see any on the mainland. Extremely variable in size and markings. The small dark-banded form which corresponds to Westerlund's *H. lampra* was not uncommon, and as far as our experience goes it appears to be exclusively a maritime variety.
- H. caperata** Mont. Not uncommon on grassy slopes on Lismore. Type and variety *ornata* Picard.
- Pupa anglica** Fér.—This was found very plentifully under stones at Ardbhan Craigs, chiefly along the edge of the pine woods, and close to the roadside, wherever the ground was wet from the trickling of water down the cliffs. Mostly

red-lipped specimens with nearly black shells. The pale white-lipped form—var. *pallida* Jeff.—also occurred.

P. cylindracea Da Costa.—Abundant, in company with the above, and a few near Dunollie Castle. Very variable in size, and light-coloured. Also common everywhere on Lismore, and more uniform in size. Adult shells were full of young ones, which came out freely in cleaning.

P. muscorum L.—A few very much weathered specimens under stones near the shore on Lismore.

Vertigo antivertigo Drap.—We found this species in great abundance on the shore of Lochan Dubh. The dead stems of last season's growth of bulrushes had drifted to the side in heaps, and on these the Vertigoes were found crawling, often quite in the water and always on wet stems. The shells are very dark and beautiful, and not in the least weathered.

V. pygmæa Drap.—Found at one spot only, near the "Dog Stone." Very scarce, but occurs alive. Chiefly from moss-shakings.

V. substriata Jeff.—Several very beautiful live specimens in moss-shakings from near Dunollie Castle.

V. edentula Drap.—Several specimens under dead sticks near the "Dog Stone," and in Dunollie Woods. In the pine woods at Ardbhan Craigs it is in some parts the commonest shell. At one spot in particular where a great pile of loose stones had slipped from the face of the cliff, and become overgrown with moss, every stone lifted was certain to have this species clinging underneath, as many as 18 specimens being taken from one small stone. On Lismore only very few were found, and these under logs at the edge of a small wood.

Balea perversa L.—Very abundant on moss-covered rocks on the roadside near Oban Station.

Clausilia rugosa Drap.—Not uncommon anywhere in the Oban district, chiefly variety *tumidula* Jeff. Specimens were

noticed crawling on the elm trees, to a great height above the ground. On Lismore it is extremely abundant, and very fine, and may almost be stroked off the wet rocks by the handful! Most of the shells are covered with a dense confervoid growth, which makes them seem unusually large, and gives them a weathered appearance, but this easily washes off and shows a beautifully marked and fresh dark epidermis underneath.

Cochlicopa lubrica Müll.—Sparingly distributed throughout the Oban district. Very common on Lismore. Both type and varieties *ovata*, *hyalina*, and *lubricoides* occurred in equal numbers in each locality.

Succinea putris L.—A small tumid form was found in great abundance in one locality on Lismore, swarming over the watercress growing on a boggy piece of ground near the shore.

Carychium minimum Müll.—Common at Ardbhan Craigs; very scarce elsewhere throughout the Oban district, and on Lismore.

Planorbis nauleus L.—A few amongst duckweed in a small pool on Lismore.

P. albus L.—In Lochan Dubh, sparingly, but nice and clean.

P. spirorbis Müll.—A few small specimens in a pool on Lismore.

P. contortus L.—A few in a drain on Lismore.

Physa fontinalis L.—Some small specimens in Lochan Dubh. Scarce.

Limnæa peregra Müll.—A few dwarfed specimens in Lochan Dubh; and in a brook near the ferry at Ardbhan Craigs we found a small distorted variety in considerable numbers, many of them showed "erosion bands," and others were subscalariform. On Lismore a small form was found in all the lochs, ponds, and streams examined, but not plentifully.

- L. truncatula** Müll.—A very minute, but apparently mature form was found in abundance in company with *S. putris*, on Lismore. Many of the shells were noticed crawling over the dry portion of stones projecting out of the boggy ground, in the full glare of the sun, which had made the stones so hot that they felt uncomfortably warm to the hand.
- Valvata piscinalis** Müll.—Lochan Dubh: very scarce and small.
- Pisidium fontinale** Drap.—A few in Lochan Dubh; some of them a good size.
- P. pusillum** Gmel.—Some good sized specimens found in Lochan Dubh, but it is far from plentiful.

LIST OF THE LAND AND FRESHWATER SHELLS OF DERBYSHIRE.

BY REV. HERBERT MILNES.

(Read before the Conchological Society, March 1st, 1893).

- Arion ater** (L.). Matlock (J. A. Howe); Winster (H. Milnes); Darley Dale (R. Standen). Common (*J. of Conch.*, vol. vii., p. 77).
- A. ater** var. **rufa** (L.). Matlock (J. A. Howe); Winster (H. Milnes).
- A. ater** var. **plumbea** Rbk. Rowsley (L. E. Adams, *J. of Conch.*, vol. vii., p. 77).
- Mr. L. E. Adams also records in *J. of Conch.*, vol. vii., p. 77, a variety taken at Clifton, near Ashbourne, which he calls *luteo-albescens*.
- Arion subfuscus** Drap. Clifton, and country south of Ashbourne. (L. E. Adams, *J. of Conch.*, vol. vii., p. 77).
- A. subfuscus** var. **brunnea** Lehm. Clifton (L. E. Adams, *J. of Conch.*, vol. vii., p. 77).

Mr. L. E. Adams mentions var. *rufo-fusca* from Clifton (*J. of Conch.*, vol. vii., p. 77).

- A. minimus** Simroth. Clifton and Rowsley (L. E. Adams, *J. of Conch.*, vol. vii., p. 77).
- A. hortensis** Fér. Matlock (J. A. Howe and H. E. Craven); Winster (H. Milnes); Darley Dale (R. Standen); Clifton (L. E. Adams, *J. of Conch.*, vol. vii., p. 77).
- A. circumscriptus** Johnst. (= *Arion bourguignati* Mab.). Common throughout the county (L. E. Adams, *J. of Conch.*, vol. vii., p. 77).
- Amalia gagates** (Drap.). Matlock (J. A. Howe).
- A. gagates** var. **plumbea** Moq. Matlock (J. A. Howe).
- Limax maximus** L. Winster (H. Milnes); Matlock (H. E. Craven); Darley Dale (R. Standen); Clifton (L. E. Adams, *J. of Conch.*, vol. vii., p. 77). Common.
- L. maximus** var. **fasciata** Moq. Winster (H. Milnes).
- L. flavus** L. Matlock (H. E. Craven); Repton (P. B. Mason). cf. *J. of Conch.*, vol. vii., p. 77.
- L. marginatus** (Müll.). (= *Limax arborum* B. Ch.). Winster (H. Milnes); Matlock (J. A. Howe); Hathersage (L. E. Adams, *J. of Conch.*, vol. vii., p. 77).
- L. marginatus** var. **nemorosa** Baud. Hathersage and Bakewell (L. E. Adams). Sparingly (*J. of Conch.*, vol. vii., p. 77).
- Agriolimax agrestis** L. Winster (H. Milnes and L. E. Adams); Matlock (H. E. Craven); Darley Dale (R. Standen). *J. of Conch.*, vol. vi., p. 249.
- A. agrestis** var. **nigra** Morelet. Clifton (L. E. Adams). *J. of Conch.*, vol. vii., p. 77.
- A. agrestis** var. **lilacina** Moq. Matlock (J. A. Howe).
- A. lævis** Müll. Darley Dale and Miller's Dale (R. Standen).
- Vitrina pellucida** (Müll.). Matlock (H. E. Craven and T. Hey); Winster (H. Milnes). *J. of Conch.*, vol. vi., p. 119. Widely distributed both in North and South Derbyshire.
- Hyalinia draparnaldi** (Beck). Matlock (J. A. Howe and H. E. Craven); Winster (H. Milnes); Darley Dale and

Miller's Dale (R. Standen); common about Derby (T. Hey, *J. of Conch.*, vol. vi., p. 119).

H. draparnaldi var. **albina** (Moq.). Miller's Dale (R. Colville).

H. glabra (Stud.). Northern Dale and Wensley (H. E. Craven); Matlock (T. Hey). Common. *J. of Conch.*, vol. vi., p. 119.

H. alliaria (Miller). Matlock (H. E. Craven); Winsters (H. Milnes); Repton (J. Hagger and T. Hey, *J. of Conch.*, vol. vi., p. 119). Darley Dale (R. Standen, *J. of Conch.*, vol. iii., p. 333). Common.

H. alliaria var. **viridula** (Jeff.). More common than the type in the neighbourhood of Buxton—as three to one (L. E. Adams, *J. of Conch.*, vol. vi., p. 248).

H. nitidula (Drap.) Matlock (H. E. Craven); Winsters (H. Milnes and J. H. Howe); Chellaston and Willington (T. Hey, *J. of Conch.*, vol. vi., p. 119). Darley Dale and Miller's Dale (R. Standen). Common.

Mr. P. B. Mason, of Burton-on-Trent, mentions having taken specimens of *H. nitidula* var. *helmi* at Miller's Dale.

H. radiatula (Alder). Repton (J. Hagger); Ambergate (T. Hey, *J. of Conch.*, vol. vi., p. 119). Matlock (H. E. Craven). Rare.

H. pura (Alder). Matlock (H. E. Craven); Little Eaton (T. Hey, *J. of Conch.*, vol. vi., p. 120). Abundant at Deepdale, (L. E. Adams, *J. of Conch.*, vol. vi., p. 248). Abundant at Matlock (G. W. Chaster, September, 1892).

H. pura var. **margaritacea** (Jeff.). Abundant at Matlock (G. W. Chaster, September, 1892).

H. crystallina (Müll.). Abundant at Matlock (H. E. Craven); Winsters (H. Milnes); Miller's Dale (R. Colville and R. Standen); Repton (J. Hagger) Common (T. Hey, *J. of Conch.*, vol. vi., p. 120).

- H. fulva** (Mull.). Matlock (H. E. Craven); Repton (J. Hagger); Darley Dale and Miller's Dale (R. Standen); Ambergate (T. Hey, *J. of Conch.*, vol. vi., p. 120). Sparingly distributed.
- H. fulva** var. **mortoni** (Jeff.). Robin's Wood and Repton (J. Hagger); Darley Dale (J. R. Hardy, *J. of Conch.*, vol. vi., p. 273).
- H. nitida** (Müll.). Local in woods at Matlock (H. E. Craven); Repton (J. Hagger); abundant in Derby district (T. Hey, *J. of Conch.*, vol. vi., p. 120).
- H. excavata** (Bean). Robin's Wood and Repton (J. Hagger); Miller's Dale (T. Hey, *J. of Conch.*, vol. vi., p. 120).
- H. excavata** var. **vitrina** (Fer.). Robin's Wood and Repton (J. Hagger).
- Helix rotundata** Müll. Common everywhere.
- H. rotundata** var. **pyramidalis** Jeff. Winster (H. Milnes).
- H. rotundata** var. **alba** Moq. Matlock (H. E. Craven); one specimen; rocks on Ashbourne Road, about five miles from Winster (H. Milnes); Miller's Dale (R. Standen); near Ashbourne (L. E. Adams, *J. of Conch.*, vol. vi., p. 249).
- H. rupestris** Drap. Common all through the Peak District (*J. of Conch.*, vol. vi., p. 121).
- H. pygmæa** Drap. Matlock (H. Milnes); Miller's Dale (R. Standen and T. Hey, *J. of Conch.*, vol. vi., p. 121).
- H. lamellata** Jeff. Hall Dale Woods, Darley Dale (J. R. Hardy). *J. of Conch.*, vol. vi., p. 314.
- H. aculeata** Müll. Hall Dale Woods, Miller's Dale, (R. Standen); Matlock (H. E. Craven and T. Hey); Eggington (G. Pullen). *J. of Conch.*, vol. vi., p. 120.
- H. pulchella** Müll. Plentiful throughout the Peak District. *J. of Conch.*, vol. vi., p. 121.
- H. pulchella** var. **costata** Müll. Matlock (H. Milnes); equally plentiful with the type in Matlock district.

- H. laticida** L. Abundant throughout the limestone district; very dark coloured specimens at Ambergate, taken by Mr. Hey (probably var. *nigrescens*). *J. of Conch.*, vol. iii., p. 333; vol. vi., p. 121.
- H. laticida** var. *subangulata* Pascal. Dovedale (C. T. Musson, *J. of Conch.*, vol. vi., p. 392).
- H. laticida** var. *minor* Moq. Alport (C. Clare Fryer, Science Gossip, 1889, p. 24).
- H. laticida** var. *albina* Menke. Matlock, one specimen (H. E. Craven); Matlock, two specimens (T. Glover, 1879, *J. of Conch.*, vol. v., p. 316); Matlock, three specimens (G. W. Chaster, 1892).
- H. laticida** monst. *scalariforme*. Matlock (J. A. Howe, *J. of Conch.*, vol. v., p. 316).
- Helix aspersa** Müll. Repton (J. Hagger); Littleover, a few specimens (T. Hey, *J. of Conch.*, vol. vi., p. 120). By no means a common shell in North Derbyshire.
- H. nemoralis** L. Common in the Peak District.
- H. nemoralis** var. *major* Fér. Smeine, near Winster (H. Milnes); band-formation 00300, 12345, 02345.
- H. nemoralis** var. *minor* Moq. Matlock (J. A. Howe); band-formation 00000, 123(45).
- H. nemoralis** var. *albolabiata* Von Mart. Matlock (J. A. Howe); Repton (J. Hagger); band-formation 00000.
- H. nemoralis** var. *bimarginata* Moq. Winster (H. Milnes); Repton (J. Hagger); band-formation (12345), 00000. Some beautiful specimens taken in Dovedale, Aug., 1892, by Mr. Frank Collier, and exhibited by him at the annual Conchological Meeting at Owens College, Nov. 4, 1892.
- H. nemoralis** var. *libellula* (Risso). Winster (H. Milnes); Matlock (J. A. Howe); Repton (J. Hagger); band-formation 00045, 00345, 00000, (12345), 00300, 00340, 12345, 02345, 12345, 123(45), 1(23)(45), 00305, (12)345, 10345, 02300, 02300.

- H. nemoralis** var. *rubella* Moq. Winsters (H. Milnes); Matlock (J. A. Howe); Dovedale, very fine specimens (F. Collier, *J. of Conch.*, vol. vii., p. 89). Band-formation 00000, 00300, 00345, (12)3(45), 123(45), (123)45, 02345, 12345, 00345.
- H. nemoralis** var. *castanea* Moq. Winsters (H. Milnes); Matlock (J. A. Howe); Dovedale, very good specimens (F. Collier, *J. of Conch.*, vol. vii., p. 88). Repton (J. Hagger). Band-formation 00000, 00300.
- H. nemoralis** var. *olivacea* (Risso). Matlock (J. A. Howe); 00000.
- H. nemoralis** var. *hyalozonata* Taylor. Matlock (J. A. Howe): 00300.
- H. hortensis** Müll. Widely distributed in the Peak District.
- H. hortensis** var. *minor* Moq. Matlock (J. A. Howe); band-formation 00000, 00300.
- H. hortensis** var. *roseolabiata* Taylor. Matlock (H. E. Craven).
- H. hortensis** var. *fuscolabiata* Von Mart. Winsters (H. Milnes); Matlock (J. A. Howe); Repton (J. Hagger); band-formation (123)45, (12345), 00000.
- H. hortensis** var. *albina* Moq. Matlock (J. A. Howe); Repton (J. Hagger); band-formation 00000.
- H. hortensis** var. *lutea* Moq. Winsters and Dovedale (H. Milnes); Matlock (J. A. Howe); Repton (J. Hagger); band-formation (12345), (123)(45), 00000, 10345, 12345, (123)45, 123(45), 12(345), 12345, (12)345, 12045.
- H. hortensis** var. *olivacea* Taylor. Matlock (J. A. Howe); 00000.
- H. hortensis** var. *lilacina* Taylor. Matlock (H. E. Craven).
- H. hortensis** var. *arenicola* Macgill. Matlock (J. A. Howe); band-formation 123(45), 12345, 00300, 00340.
- H. arbustorum** L. Winsters (H. Milnes); Matlock (H. E. Craven); Derby (T. Hey); Miller's Dale (R. Standen). Frequent throughout the district.

- H. arbustorum** var. **alpestris** Ziegl. Matlock (H. E. Craven); Bonsall (H. Milnes); Millers' Dale (F. Collier and R. Standen); Buxton (J. H. Ponsonby, *J. of Conch.*, vol. iii., p. 247). Baslow (L. E. Emmet, *J. of Conch.*, vol. iii., p. 303).
- H. arbustorum** var. **conoidea** Westerl. Winster (H. Milnes).
- H. arbustorum** var. **marmorata** Roffiæn. Miller's Dale (R. Standen); Baslow (L. E. Emmet, *J. of Conch.*, vol. iii., p. 303).
- H. arbustorum** var. **cincta** Taylor = **pallida** Taylor. Matlock (H. E. Craven); Winster (H. Milnes); Castleton (C. Oldham, *J. of Conch.*, vol. vi., p. 276).
- H. arbustorum** var. **flavescens** Moq. Matlock (H. E. Craven); Winster (H. Milnes); Hartington (W. Nelson, *J. of Conch.*, vol. iii., p. 249). This variety is more frequent than the type in the neighbourhood of Winster.
- H. arbustorum** var. **albina** Moq. Winster (H. Milnes); Great Longston (Miss E. B. Fairbrass, *J. of Conch.*, vol. iii., pp. 250, 305).
- H. arbustorum** var. **major** Pfr. Matlock (H. E. Craven).
- H. arbustorum** var. **minima** Pfr. Matlock (H. E. Craven).
- H. arbustorum** monst. **sinistrorsum** Taylor. Ashwood Dale, near Buxton (by Mr. C. Oldham, *J. of Conch.*, vol. vi., p. 225).
- H. arbustorum** m. **scalariforme**. Winster (H. Milnes).
- Helix rufescens** Penn. Matlock (H. Milnes and H. E. Craven); Belper (T. Hey). Sparingly distributed (*J. of Conch.*, vol. vi., p. 120).
- H. hispida** L. (= **H. concinna** Jeff.). Widely distributed. *J. of Conch.*, vol. vi., p. 120; vol. iii., p. 333.
- H. hispida** var. **albida** Jeff. Monsall Dale (F. Collier); Miller's Dale (R. Standen); Winster (L. E. Adams, *J. of Conch.*, vol. vi., p. 249).
- H. hispida** var. **subrufa** Moq. Matlock (H. E. Craven).

- H. hispida** var. **conica** Jeff. Matlock (H. E. Craven).
- H. hispida** var. **albida** Jeff. Tideswell (W. D. Roebuck and J. A. Howe); Matlock (H. E. Craven and G. W. Chaster); Winster (L. E. Adams, *J. of Conch.*, vol. iii., p. 333; vol. vi., p. 249).
- H. granulata** Alder (= **H. sericea** Jeff.).—Ambergate and Little Eaton (T. Hey, *J. of Conch.*, vol. vi., p. 120).
- H. fusca** Mont. Cressbrook Dale (H. Shaw, *J. of Conch.*, vol. iii., p. 286).
- H. itala** L. (= **H. ericetorum** Müll.). Dovedale (H. Milnes); Crich (J. A. Howe); Miller's Dale (T. Hey); Cromford (H. E. Craven). Very local. (*J. of Conch.*, vol. vi., p. 120).
- H. itala** var. **alba** Charp. Monsall Dale (H. E. Craven).
- H. caperata** Mont. Ticknall quarry (J. Hagger); Matlock (J. A. Howe); Ambergate (T. Hey, *J. of Conch.*, vol. vi., p. 121).
- H. virgata** Da Costa. Near Ticknall, probably imported in ballast (J. Hagger); near Willington (T. Hey, *J. of Conch.*, vol. vi., p. 121).
- Buliminus obscurus** Müll. Common in the Peak District.
- B. obscurus** var. **albina** Moq. Matlock (H. E. Craven).
- Pupa secale** Drap. Miller's Dale (T. Hey); not common (*J. of Conch.*, vol. vi., p. 121).
- Pupa anglica** Fér. (= **P. ringens** Jeff.). A few near Buxton (T. Hey); Matlock (G. W. Chaster, *J. of Conch.*, vol. vi., p. 121).
- P. cylindracea** Da Costa (= **P. umbilicata** Drap.). Abundant (*J. of Conch.*, vol. vi., p. 121).
- P. cylindracea** var. **albina** Moq. On limestone rocks at Cromford (H. Milnes).
- P. muscorum** (L.) (= **P. marginata** Drap.). Matlock (H. E. Craven); Dovedale (J. Hagger); Buxton (T. Hey, *J. of Conch.*, vol. vi., p. 121). Sparingly distributed.
- Vertigo pygmæa** (Drap.). Burton-on-Trent (P. B. Mason).

- V. substriata** (Jeff.). Cresswell (Edgar Pickard, *J. of Conch.*, vol. iv., p. 172). Matlock (G. W. Chaster).
- V. pusilla** Müll. Cresswell (Edgar Pickard, *J. of Conch.*, vol. iv., p. 172).
- V. angustior** Jeff. Cresswell (Edgar Pickard), *J. of Conch.*, vol. iv., p. 172).
- V. edentula** (Drap.). Bretby Wood, near Repton (J. Hagger); Matlock (H. E. Craven); Hall Dale Wood (R. Standen); Buxton (T. Hey, *J. of Conch.*, vol. vi., p. 122).
- Balea perversa** (L.). Cromford (H. Milnes); Haddon Hall (T. Hey, *J. of Conch.*, vol. vi., p. 122).
- Clausilia perversa** (Pult.) (= **C. rugosa** Drap.). Abundant throughout the district. One specimen with double mouth found at Winster (H. Milnes); one specimen, peculiarly turreted, found near Winster (A. G. Stubbs); an intermediate variety between type and var. *dubia* taken at Matlock, 1884 (H. E. Craven); perhaps = var. *tumidula* Jeff.
- C. perversa** var. **gracilior** Jeff. Matlock (H. E. Craven); Winster (H. Milnes).
- Clausilia laminata** Mont. Matlock (J. A. Howe and H. Milnes); Via Gellia (H. Milnes); Miller's Dale (R. Standen); Monsall Dale (T. Hey); Cressbrook Dale (H. Shaw, *J. of Conch.*, vol. vi., p. 122; vol. iii., p. 286). Not plentiful, but locally abundant, as on limestone rocks at Matlock. Some curiously decollated specimens were taken at Matlock by Mr. G. W. Chaster, September, 1892.
- C. laminata** var. **albina** Moq. Two specimens taken near Winster by Mr. L. E. Adams (*J. of Conch.*, vol. vi., p. 249).
- Azeca tridens** (Pult.). Matlock (H. E. Craven and H. Milnes); Sinfen Moor (T. Hey, *J. of Conch.*, vol. vi., p. 122).
- Cochlicopa lubrica** Müll. Matlock, Winster, Buxton (H. Milnes). Common everywhere (*J. of Conch.*, vol. vi., p. 122).
- C. lubrica** var. **hyalina** Jeff. Matlock (H. E. Craven).

- C. lubrica** var. **lubricoides** Fér. Matlock (H. E. Craven).
Cæcilioides acicula (= *Achatina acicula* Müll.). Repton (J. Hagger); Miller's Dale (F. Collier, R. Standen, and T. Hey, *J. of Conch.*, vol. vi., p. 122).
- Succinea putris** (L.). Common in marshy ground. Cromford (H. Milnes and J. A. Howe); Weston (T. Hey, *J. of Conch.*, vol. vi., p. 119).
- S. putris** var. **ferussina** Moq. Matlock (J. Fitzgerald, *Science Gossip*, 1881, p. 153).
- S. elegans** Risso. Equally abundant with *S. putris*, and in same localities (*J. of Conch.*, vol. vi., p. 119).
- Garychium minimum** Müll. Matlock (H. E. Craven); Darley Dale (R. Standen); Miller's Dale (T. Hey, *J. of Conch.*, vol. vi., p. 122).
- Planorbis fontanus** Lightfoot (= *P. nitidus* Jeff.). Marple (R. Cairns, *Conchologist*, vol. i., p. 46). Derby canal (T. Hey); Cromford canal (J. A. Howe).
- P. albus** (L.). Milton (J. Hagger); Weston and Chellaston (T. Hey); Cromford canal (H. E. Craven and J. A. Howe). *J. of Conch.*, vol. vi., p. 118.
- P. parvus** Say (= *P. glaber* Jeff.). In pits near Willington (J. Hagger).
- P. spirorbis** Müll. Cromford canal (H. Milnes and J. A. Howe); ditches at Little Eaton (T. Hey); Willington (J. Hagger). Abundant (*J. of Conch.*, vol. vi., p. 118).
- P. vortex** (L.) In equal abundance with *P. spirorbis* (*J. of Conch.*, vol. vi., p. 118).
- P. carinatus** Müll. Cromford (H. Milnes and H. E. Craven); Derby (T. Hey). Frequent (*J. of Conch.*, vol. vi., p. 118).
- P. umbilicatus** Müll. (= *P. complanatus* Jeff.) Old Trent, Repton (J. Hagger); near Derby (T. Hey); Cromford (H. Milnes and J. A. Howe). Plentiful (*J. of Conch.*, vol. vi., p. 118).
- P. umbilicatus** var. **albina** Jeff. Top Dam, near Repton (J. Hagger).

- P. corneus** (L.). Burton-on-Trent (J. Hagger); Derby canal, large specimens (T. Hey); Cromford, but very sparingly (*J. of Conch.*, vol. vi., p. 118).
- P. contortus** (L.). Old Trent, near Repton (J. Hagger); Cromford canal (H. Milnes); Weston canal (T. Hey, *J. of Conch.*, vol. vi., p. 118). Moderately common.
- P. contortus** var. **albida** Jeff. Marple (R. Cairns, *Conchologist*, vol. i., p. 46). Marple is just on the confines of Cheshire and Derbyshire.
- Bullinus hypnorum** (L.). River Dove, near Repton (J. Hagger); Darley Dale (J. A. Howe); Little Eaton, a few specimens (T. Hey). Sparingly distributed (*J. of Conch.*, vol. vi., p. 118).
- Physa fontinalis** (L.). Abundant everywhere (*J. of Conch.*, vol. vi., p. 118).
- Amphipeplea glutinosa** (Müll.). Two specimens in a brook near Derby (T. Hey, *J. of Conch.*, vol. vi., p. 118).
- Limnæa peregra** (Müll.). Very fine specimens in Cromford canal (H. Milnes and H. E. Craven); Abundant (*J. of Conch.*, vol. vi., p. 119).
- L. peregra** var. **ovata** Drap. Matlock (H. Milnes); Darley Dale (R. Standen).
- L. peregra** var. **acuminata** Jeff. Via Gellia (H. Milnes).
- L. peregra** var. **picta** Jeff. Winster (H. Milnes, *J. of Conch.*, vol. iii., p. 153).
- L. auricularia** (L.). Cromford canal (H. Milnes); Repton (J. Hagger); Weston and Chellaston (T. Hey); very fine specimens (*J. of Conch.*, vol. vi., p. 119).
- L. auricularia** var. **acuta** Jeff. Cromford canal (H. Milnes).
- L. stagnalis** (L.). Cromford canal (H. Milnes, H. E. Craven, and J. A. Howe); Weston and Chellaston (T. Hey, *J. of Conch.*, vol. vi., pp. 118, 384). Mr. Hey took some specimens near Derby with a strongly reflected outer lip (*J. of Conch.*, vol. vi., p. 384).

- L. stagnalis** var. **fragilis** (L.). Cromford canal (J. A. Howe).
- L. stagnalis** var. **turgida** Menke. One specimen in Cromford canal.
- L. palustris** (Müll.). Old Trent, Repton (J. Hagger); Weston (T. Hey, *J. of Conch.*, vol. vi., p. 119). By no means common.
- L. palustris** var. **elongata** Moq. Old Trent, Repton (J. Hagger).
- L. palustris** var. **tincta** Jeff. Old Trent, Repton (J. Hagger).
- L. palustris** var. **albida** Jeff. Old Trent, Repton (J. Hagger).
- L. truncatula** (Müll.). Moderately common in North Derbyshire, sparingly in South Derbyshire (H. Milnes, J. A. Howe, H. E. Craven, and T. Hey).
- L. truncatula** var. **ventricosa** Moq. Two specimens near Winster (H. Milnes).
- L. truncatula** var. **elegans** Jeff. Winster (H. Milnes).
- L. truncatula** var. **microstoma** Drouet. Winster (H. Milnes).
- L. truncatula** var. **major** Moq. Winster (H. Milnes).
- L. truncatula** var. **minor** Moq. Winster (H. Milnes).
- L. truncatula** var. **albida** Jeff. Winster (H. Milnes).
- L. truncatula** monst. **scalariforme** Jeff. Winster (H. Milnes).
- L. glabra** (Müll.). Two specimens in a pond at Farnal Hall, near Derby (T. Hey, *J. of Conch.*, vol. vi., p. 119).
- Ancylus fluviatilis** Müll. River Derwent (H. Milnes and H. E. Craven); Darley Dale (R. Standen); Derby (T. Hey, *J. of Conch.*, vol. vi., p. 119). Common.
- A. fluviatilis** var. **albida** Jeff. Pond near Whatstandwell (H. Milnes); tributary of Wye in Miller's Dale (T. Hey).
- A. lacustris** (L.). River Trent, Newton Solney (J. Hagger); Cromford Canal (H. Milnes and H. E. Craven); Weston-on-Trent (T. Hey, *J. of Conch.*, vol. vi., p. 119). Local, but not frequent.

A. lacustris var. **albida** (Jeff.). River Trent; Newton Solney (J. Hagger).

Neritina fluviatilis (L.). Canal at Willington (J. Hagger); Matlock (H. Milnes and J. A. Howe); Borrowash (T. Hey, *J. of Conch.*, vol. vi., p. 117).

Viviparus contectus (Millet). One very young specimen adhering to floating leaves of amphibious *Persicaria* in Cromford Canal, near High Peak Junction (H. E. Craven); two shells in Derby and Burton canal, near Willington (T. Hey, *J. of Conch.*, vol. vi., p. 117).

V. viviparus (L.). Scarce and small in Cromford Canal (H. Milnes, H. E. Craven, and J. A. Howe); abundant and fine in canal at Willington (T. Hey, *J. of Conch.*, vol. vi., p. 118).

Bythinia tentaculata (L.). Cromford Canal (H. Milnes and H. E. Craven); common. *J. of Conch.*, vol. vi., p. 118.

B. leachii (Shepp.). Eggington (J. Hagger); Shardlow (T. Hey, *J. of Conch.*, vol. vi., p. 118). Moderately common.

Valvata piscinalis (Müll.). Cromford Canal (H. Milnes, H. E. Craven, and J. A. Howe); Derby (T. Hey, *J. of Conch.*, vol. vi., p. 118). Abundant.

V. piscinalis monst. **sinistrorsum** Jeff. Cresswell (E. Pickard, *J. of Conch.*, vol. iv., p. 145).

V. cristata Müll. Eggington (P. B. Mason).

Unio tumidus Phil. Cromford Canal (H. Milnes); Willington canal (J. Hagger and T. Hey, *J. of Conch.*, vol. vi., p. 117). Plentiful.

U. tumidus var. **ovalis** (Mont.). Park Pond, Repton (J. Hagger).

U. tumidus var. **radiata** Colb. Park Pond, Repton (J. Hagger).

U. pictorum (L.). Cromford Canal (H. Milnes); Park Pond, Repton (J. Hagger); Derby and Burton Canal (T. Hey, *J. of Conch.*, vol. vi., p. 117). Plentiful.

U. pictorum v. **curvirostris** Norm. Repton (P. B. Mason).

Anodonta cygnea (L.). Frequent in canals, etc. (*J. of Conch.*, vol. vi., p. 117).

Mr. Hagger took a specimen in Park Pond, Repton, which he marks var. *zellensis* Gmel.

A. anatina (L.). Very plentiful. (*J. of Conch.*, vol. vi., p. 117).

A. anatina var. **ventricosa** C. Pfr. Park Pond, Repton (J. Hagger).

A. anatina var. **complanata** Rossm. Park Pond, Repton (J. Hagger).

Sphærium corneum (L.). Very frequent. (*J. of Conch.*, vol. vi., p. 116).

S. corneum var. **flavescens** Macgill. Cromford Canal (H. Milnes); Bretby (J. Hagger). Sparingly.

S. rivicola (Leach). Cromford Canal (J. A. Howe); Willington (J. Hagger); Chellaston (T. Hey, *J. of Conch.*, vol. vi., p. 116). Sparingly in Matlock district, but much more frequent in South Derbyshire.

S. pallidum Gray (= **S. ovale** Jeff.). One specimen in canal at Sawley (T. Hey, *J. of Conch.*, vol. vi., p. 116). Peak Forest canal (R. Standen, *Conchologist*, vol. i., p. 56).

S. lacustre (Müll.). River Derwent (H. E. Craven); canal near Derby (Hey); pond at Matlock (H. E. Craven, *J. of Conch.*, vol. vi., p. 116). Not common.

S. lacustre var. **ryckholtii** (Norm.). Dead specimens taken from mud round sides of pool near Winster (H. Milnes); pond at Matlock (H. E. Craven).

Pisidium amnicum (Müll.). Cromford (H. Milnes and H. E. Craven); Ambergate (T. Hey, *J. of Conch.*, vol. vi., p. 116).

P. fontinale (Drap.). Matlock (J. A. Howe); Stanton (H. Milnes); Monsall Dale (T. Hey). Not plentiful (*J. of Conch.*, vol. vi., p. 116).

- P. fontinale** var. **henslowana** (Shepp.). Cromford Canal (H. E. Craven).
- P. fontinale** var. **cinerea** Alder. Stanton-in-Peak (H. Milnes); pond near Matlock (H. E. Craven).
- P. pusillum** (Gmelin). Winstar (H. Milnes); pond at Bonsall Moor (H. E. Craven); Monsall Dale (T. Hey, *J. of Conch.*, vol. vi., p. 117). Not frequent.
- P. pusillum** var. **obtusalis** (Lam.). Winstar (H. Milnes).
- P. nitidum** Jen. Via Gellia (H. Milnes); Cromford (T. Hey, *J. of Conch.*, vol. vi., p. 117). Not common.
- P. milium** Held. (= **P. roseum** Jeff.) See *J. of Conch.*, vol. vi., p. 117. Mr. Hey says, 'I have certainly found this in the county, but am uncertain of its locality.' Matlock (H. E. Craven).
- Dreissensia polymorpha** (Pall). Canal at Willington (J. Hagger); Butterley (T. Hey). Local, but abundant where it occurs (*J. of Conch.*, vol. vi., p. 117).

BIBLIOGRAPHY.

New List of Nottinghamshire Mollusca.—Mr. J. W. Carr, M.A., has just published a most useful book, entitled 'A Contribution to the Geology and Natural History of Nottinghamshire' (1893, small 8vo., paper boards, 96 pages, price 2/-), to which Mr. B. Sturges Dodd contributes (pp. 66-75) a revised list of the mollusca; full details of localities are given, and one hundred and nine species and a large number of varieties are included.—W.D.R.

A CONTRIBUTION TOWARDS A LIST OF THE
MARINE MOLLUSCA AND BRACHIOPODA OF
THE NEIGHBOURHOOD OF OBAN.

BY G. W. CHASTER AND W. H. HEATHCOTE.

(Read before the Manchester Branch, October 12th, 1893.)

IN August last Captain Farrer, Messrs. Hardy and Standen, and the authors made an excursion to Oban for the purpose of studying the molluscan fauna of that locality, so rich in its conchological treasures.

Through the kindness of Mr. John Munro a capital steam launch, the 'Lady of the Lake,' was engaged, in which for four days we cruised about dredging in the neighbourhood, hauls being made off Maiden Island, in Kerrera Sound, outside Kerrera, off Lismore, and in the Sound of Mull. On other occasions dredging operations were conducted from a rowing boat, in which it was found practicable to work in depths up to eighteen or twenty fathoms. The greatest depth from which hauls were made was about thirty-five fathoms. In all seventy-four successful hauls were made.

The writers remained a few days after the return of the rest of the party, in order to have an opportunity of searching the shore during the recess of the highest spring tides of the month. This shore work proved extremely troublesome and laborious; the *Serpulae* covering the stones cut the hands severely, whilst the heat of the mid-day sun, together with the exertion it was necessary to put forth in order to move the masses of rock under which were the objects sought, well nigh prostrated both. So rich, however, was the reward in objects of perennial interest that any temporary discomfort was far outweighed.

A considerable quantity (about three-quarters of a hundred-weight) of the finer material from the dredgings was brought

home to be searched through at leisure. This has yielded an abundant harvest of the smaller species. Altogether one hundred and ninety-six species were obtained, some of them, as will be seen from the appended list, of considerable rarity.

After careful consideration it has been decided to draw up and publish a full list of all the species now known to inhabit the district, those previously recorded but not taken during our excursion as well as those newly found by us being distinguished by prefixed marks.

Every care has been taken to ensure accuracy in identification, doubtful specimens always having been submitted to well-known authorities, and we here take the opportunity of thanking Canon Norman, Mr. H. K. Jordan, and Mr. J. T. Marshall for their kind assistance.

The nomenclature used by the late Dr. Jeffreys in his 'British Conchology' having, in many cases, been superseded by a newer and frequently a better and more correct one—we have followed that adopted by Canon Norman in his 'Revision of the British Mollusca' (Annals and Magazine of Natural History, 1890), as far as it is at present completed, and that in the privately published Catalogue of his Museum for the remainder. A few emendations furnished by this gentleman in a letter have also been adopted. The better known synonyms of Jeffreys are given italicised in brackets.

One of the species met with seems worthy of special mention. *Cyclostrema millepunctatum*, Friele was recorded as occurring in British waters by one of the writers early in the present year (Chaster: On the occurrence of *Cyclostrema millepunctatum*, Friele, off the Isle of Man.—Conchologist, June, 1893). It is interesting to note that so soon afterwards it has been found again at another locality so far distant.

It is perhaps not out of place here to remark that in addition to the species mentioned in the list, which are to all appearance recent, there were dredged fossil or semi-fossil shells of forms which no longer inhabit the area in which our

operations were conducted. These are *Pecten islandicus*, valves of which were dredged off Bhaic Island and in the Sound of Mull; and the little *Portlandia pygmæa* and *P. lucida*, of which the former still lives in the Minch, and the latter in deep water at a considerable distance north of the Hebrides.

All the available literature on the Mollusca of the West of Scotland has been consulted. The most noteworthy records of Oban species are Canon A. M. Norman's list and Mr. R. D. Darbishire's supplement. The latter gentleman has kindly lent a MS. list drawn up from the results of his own work, together with a few additional notes contributed by the late Mr. F. Archer, of Liverpool. In the case of species named in these lists the initials of the respective writers are given, except where the occurrence of the form is recorded by both, when they are omitted to save space.

The other works to which reference is occasionally made are—

E. Forbes, 'British Marine Conchology,' 1850.

J. G. Jeffreys, 'British Conchology,' 1863—69.

A. Brown, 'Mollusca of the Firth of Clyde,' 1878.

References to previous records are given in square brackets.

In the following list species which have been recorded but which were not obtained by us are marked with one asterisk, and those which we have been able to add to the list with two.

** *Sepiola rondeletii*, Leach. Three specimens dredged.

** *Leuconia bidentata*, Montg. (*Melampus bidentatus*).

Very common under stones below high water mark on the shore south of Oban.

** *Alexia myosotis*, Drap. (*Melampus myosotis*). Two or three taken alive among decaying sea-weed under stones at high water mark near Kerrera ferry.

** *Doris tuberculata*, Cuv. Not uncommon under stones at low water.

- ** **D. repanda**, Alder and Hanc. Dredged and taken on the shore.
- ** **Tornatina truncatula**, Brug. (*Utriculus truncatulus*). Two dead specimens dredged.
- ** **Diaphana hyalina**, Turton. (*Utriculus hyalinus*). Two dredged dead.
- ** **Philine punctata**, Clark. A fine fresh example dredged.
- * **Aplysia punctata**, Cuv. [R.D.D. MS.].
- ** **Pleurobranchus plumula**, Montg. Two taken alive on stones on the shore near Kerrera ferry. The shell of the larger measures 17 mm.
- Clathurella linearis**, Mont. (*Defrancia linearis*). [A.M.N.; R.D.D. MS.]. Dredged alive and dead. There is perhaps no British shell which so well repays careful microscopic examination as a fresh specimen of this species, the sculpture of which is exquisitely delicate.
- ** **C. leufroyi**, Mich. An immature example dredged alive off Lismore. This species appears to be scarce everywhere in our seas. It occurs in the Clyde district (Brown).
- ** **Mangelia costata**, Don. (*Pleurotoma costata*) Fine examples dredged alive and dead off Maiden Island and in Kerrera Sound.
- * **M. striolata**, Phil. [A.M.N.]
- * **M. attenuata**, Mont. [A.M.N.]
- M. brachystoma**, Phil. [Off Dunolly Castle, Forbes; A.M.N.].
A fresh specimen with obliquely set ribs dredged off Maiden Island.
- Hædropleura septangularis**, Mont. (*Pleurotoma septangularis*). [A.M.N.]. Two fine live examples dredged off Maiden Island.
- Bela rufa**, Mont. (*Pleurotoma rufa*) [var. *ulideana*, Jeffreys]. Two forms, one small and stumpy with oblique ribs, the other elongated, occurred alive in the dredgings. A slender specimen, purple-black in colour, was taken on the shore.

B. turricola, Mont. [var. *rosea*, Jeffreys.] A few specimens dredged alive and dead. The var. *rosea*, Sars., occurs with the type.

Neptunea antiqua, L. (*Fusus antiquus*). [A.M.N.; scarce and small, white and dark vars., R.D.D. MS.]. Small immature specimens were dredged in Kerrera Sound. The inside of the mouth is of a rich orange-yellow.

Sipho gracilis, Da Costa. (*Fusus gracilis*). [R.D.D. MS.]. Two dredged alive off Lismore. Mr. H. K. Jordan says of them, in lit.: 'They are acuminate specimens, differing from the var. *convoluta* in the whorls being less rounded.' The nucleus in the specimens of this species and the last is less globular than usual, being compressed so as to produce no enlargement.

Buccinum undatum, L. In Kerrera Sound the type is fairly common, and with it were taken one or two remarkably thin and translucent specimens intermediate between the type and the var. *pelagica*, King. A small solid form is common—under stones on the shore near Oban, the mouth being generally tinged more or less deeply with brown or purple. This Mr. H. K. Jordan refers to the var. *littoralis*, King.

Nassa incrassata, Ström. A few dredged dead.

N. reticulata, L. [R.D.D. MS.] This is common on sandy shores in the Clyde district (Brown).

Murex erinaceus, L. [A.M.N.] Dead and worn specimens dredged.

Trophon truncatus, Ström. Fine examples dredged and smaller ones taken in great abundance under stones in the lower part of the littoral zone near the ferry to Kerrera. The number of ribs varies very greatly, ranging from fourteen to twenty-two on the body whorl.

** **Trophon muricatus**, Mont. A dead but fresh specimen dredged. It has fourteen ribs and twelve spiral lines on the body whorl.

T. barvicensis, Johnst. A number of living and dead specimens of this elegant shell dredged. We are unable to consider this as more than a variety of *T. muricatus*, Mont. Although typical examples, such as our Oban ones, are quite distinct from Guernsey specimens of the last-named species, yet the two appear to be connected by intermediate forms which occur at the Isle of Man, a locality lying between the places named. We have very carefully examined specimens from these three localities, and give the results:—

	OBAN (16 SPECIMENS).	ISLE OF MAN (7 SPECIMENS).	GUERNSEY (6 SPECIMENS).
Average No. of Ribs...	11·4	12·5	15
Range in No. of Ribs	10—12	12—15	14—16
Average No. of Spiral Striæ	7	9	11
Range in No. of Spiral Striæ	6—8	7—11	8—13

Not only do the Manx specimens present gradations in the number of ribs and spiral lines, but also in the character of the sculpture, the spiral lines being sometimes only developed in the flounce-like ribs, as in typical *barvicensis*, whilst at others they run regularly and continuously round the whorls as in *muricatus*. As regards colour, too, it is worthy of mention that one of the most characteristic *barvicensis* we have from the Isle of Man is tinged with pink. With regard to the slight malacological differences it seems to us that these too may not improbably be merely varietal, an opinion which we hope to have an early opportunity of putting to the test.

Purpura lapillus, L. Abundant, especially on the rocks at Fraoich Island, where the adult shells are completely covered with *Balani*. Yellowish-white and white shells predominate, banded ones being rarely observed.

Trivia europæa, Mont. (*Cypræa europæa*). Common on the shore near Kerrera ferry and in some dredgings off Fraoich Island. As is usual in specimens from northern localities all are devoid of spots. A fine series of the

young in all stages of growth was obtained. These younger ones are delicate and beautiful objects, puzzling to anyone acquainted only with the adult.

Aporrhais pes-pellicani, L. One living and two or three dead specimens dredged between Kerrera and Lismore in mud.

** **Triforis perversa**, L. (*Cerithium perversum*). One dredged alive.

Bittium reticulatum, Da Costa. (*Cerithium reticulatum*). [R.D.D. MS.]. A few fresh examples dredged.

* **Cerithiopsis tubercularis**, Mont. [A.M.N.].

Trichotropis borealis, Brod. and Sow. This species is quite common on hard ground everywhere near Oban, especially in Kerrera Sound. Unfortunately the majority of specimens lose much of their beauty on drying, owing to the shrinking of the epidermal spiny processes. A few of the specimens have the interior of a pure white instead of the usual-brown colour.

Turritella terebra, L. Dredged alive with the var. *nivea*, Jeff. in mud between Kerrera and Lismore. Brown states that in the Clyde district the variety selects a rather cleaner bottom than the type.

** **Cæcum glabrum**, Mont. Two specimens were found in the dredgings.

Littorina littorea, L. Abundant everywhere in the lower littoral zone, living amongst *Fuci*.

L. rudis, Maton. [Type and var. *tenebrosa*, A.M.N.; vars. *sulcata* and *tenebrosa*, R.D.D. MS.]. Very abundant on rocks just below the high water mark of ordinary tides.

L. obtusata, L. This species swarms on the *Fuci* in the littoral zone. The colouring is very varied—yellow, olive, green, and purple-black. Many specimens are banded with black, or tessellated in shades of reddish brown, having a beautiful

- appearance when wet. The banded ones occur chiefly south and the tessellated north of Oban. The var. *neritiformis*, Bro. occurs plentifully.
- ** **Lacuna pallidula**, Da Costa. A single small dead shell dredged.
- L. divaricata**, Fabr. Small specimens taken alive among *Fuci* on the shore and in the dredgings.
- L. crassior**, Mont. [Three dead specimens, one large, dredged, R.D.D. MS.]. A young dead example dredged.
- ** **Skenea planorbis**, Fabr. A few taken alive under stones on the shore and dead in the dredgings.
- ** **Homalogyra atomus**, Phil. Live and dead specimens occurred very sparingly in the dredgings. In some cases the shell exhibits strongly marked curved lines of growth.
- ** **H. rota**, F. and H. Two dead specimens dredged. This species appears to be met with alive at but few localities. Mr. Robertson has taken it alive off Little Cumbrae in the Clyde district (Brown).
- ** **Jeffreysia diaphana**, Alder. A few live specimens in *Laminaria* washings.
- ** **J. opalina**, Jeff. Immature specimens taken with the preceding.
- * **Zippora membranacea**, Adams. (*Rissoa membranacea*.) [A.M.N.].
- Rissoa parva**, Da Costa. Abundant on *Laminaria*. A few examples of the var. *interrupta*, Adams, were met with. This is contrary to the general rule that in northern localities the latter predominates.
- R. inconspicua**, Alder. [A.M.N.]. One or two dead examples dredged. The variety *sarsii*, Loven (*Rissoa albella* var. *sarsii*—we unhesitatingly follow Canon Norman in uniting *albella* and *inconspicua*—) is common and of large size (4.5 mm.) on *Laminaria*, and occurs sparingly in the dredgings.

- R. violacea**, Desm. [A.M.N.]. One dead example dredged. This species occurs at several places in the Clyde district (Brown).
- ** **Alvania subsoluta** var. **abyssicola**, Forbes. (*Rissoa abyssicola*). Two dead specimens off Lismore. In upper Loch Linnhe Mr. Knight took this species in abundance in 11, 14, and 24 fathoms. It was discovered by Messrs. MacAndrew and Forbes in Loch Fyne.
- ** **A. cancellata**, Da Costa. A single dead specimen dredged in Kerrera Sound.
- A. reticulata**, Mont. Common alive and dead in the dredgings.
- ** **A. punctura**, Mont. A few dead specimens in the dredgings.
- ** **Flemingia costata**, Adams. (*Rissoa costata*). Several dead specimens dredged.
- Cingula semistriata**, Mont. (*Rissoa semistriata*). [A.M.N.]. Taken alive in *Laminaria* washings.
- ** **C. obtusa**, Cantr. (*Rissoa soluta*, Auct. Britt.). This occurs rather sparingly, alive and dead, in the dredgings. Some of the specimens are of large size, one measuring 2 mm. in height.
- ** **C. trifasciata**, Adams. (*Rissoa cingillus*). Very abundant everywhere under stones just below high water mark.
- Onoba striata**, Adams. (*Rissoa striata*). Very common under stones on the shore, and in some of the dredgings in which a few large distorted specimens (var. *distorta*, Mar.) occurred. Of the var. *saxatilis*, Müll. (= *arctica*, Lov.) one live and several dead examples were dredged.
- O. vitrea**, Mont. [A.M.N.]. One dead specimen dredged.
- Hydrobia stagnalis**, Bast. (*H. ulvæ*). A few examples of the variety *barleei*, Jeff. were taken alive under stones on the shore south of Oban. Jeffreys records this variety from the Hebrides.

Capulus hungaricus, L. [R.D.D.]. One living and several dead immature examples dredged in Kerrera Sound.

Velutina lævigata, Penn. Not uncommon alive in dredgings, and on the shore under stones at low water.

** **Lamellaria perspicua**, L. One taken alive on the shore near Kerrera ferry.

Lunatia pulchella, Risso. (*Natica alderi*, Forbes). [dredged alive, R.D.D. MS.]. A few dead specimens dredged.

* **L. montagui**, Forbes. (*Natica montacuti*). [A.M.N.].

* **L. catena**, Da Costa. [R.D.D.].

* **Amauropsis islandica**, Bean. (*Natica islandica*). [One dead, R.D.D. MS.].

** **Cioniscus unicus**, Mont. (*Aclis unica*). A single dead example of this delicately sculptured little shell was found in the dredgings.

Turbonilla rufa, Phil. (*Odostomia rufa*). [A.M.N.]. Several fine live and dead examples of the var. *fulvocincta*, Thomp. were dredged in Kerrera Sound and off Maiden Island.

T. lactea, L. [R.D.D. MS.]. Dwarfed specimens, apparently belonging to the var. *paullula*, Jeff., were dredged dead.

** **T. indistincta**, Mont. A dead and broken specimen dredged in Kerrera Sound.

** **Parthenia interstincta**, Mont. (*Odostomia interstincta*). A few small live and dead examples in the dredgings.

** **P. scalaris**, Forbes. A dead specimen of the var. *rufescens*, Forbes, dredged. This form occurs in many places in the Clyde district (Brown).

* **P. decussata**, Mont. [Jeffreys; A.M.N.].

** **P. spiralis**, Mont. Dead, in dredgings.

** **Odostomia conspicua**, Alder. An immature fresh specimen dredged. Jeffreys records it from Loch Fyne.

O. conoidea, Brocc. Fine and moderately common in the dredgings.

O. unidentata, Mont. [A.M.N.]. Occurred sparingly live and dead in the dredged material.

** **O. turrita**, Hanley. Dredged dead.

** **O. nivosa**, Mont. Two dead specimens dredged.

** **O. pallida**, Mont. A few examples were taken alive from the ears of *Pecten opercularis* dredged near Fraoich Island. The reason of this commensalism may be as Jeffreys suggests, that the *Odostomia* subsists on the faecal matter of the scallop, or, as seems quite as likely, that the active movements of the latter constantly carry the little gastropod to 'fresh woods and pastures new,' where provision may be brought within reach of its toothless mouth. It is ensconced on the only part of the *Pecten* from which it is not liable to be ousted during the erratic flights of the latter.

We cannot refrain from here quoting Clark's remarks on this species and the so called species *rissoides* and *albella*. 'We have not the slightest doubt that the *Chemnitzia rissoides* is a dwarf littoral variety of the *pallida*. A comparison of our notes on these two animals bear us out in this view; these two alone agree, whilst every other exhibits some difference. . . . This *rissoidean* variety of *Chem. pallida* is the parent of the *C. albella* and *C. dubia* of authors.' Our own observations of these forms bring us into complete accord with the views of our most competent marine malacologist.

* **O. umbilicaris**, Malm. [Jeffreys; A.M.N.]. Very rare in Clyde district (Brown).

O. lukisi, Jeff. [dredged in 20—25 f., Jeffreys; A.M.N.]. One live and two dead specimens in the dredged material. In addition to the general shape and other characters given in 'British Conchology,' a careful examination of the apex of the shell gives a ready means of recognition. The first whorl visible in side view is keeled above, this keel surrounding a small concavity in which, when looked at from

above, part of the nucleus of the shell is seen coiling downwards. Our specimens from Guernsey and Puffin Island, near Anglesea, exhibit the same peculiar features.

- ** **O. minima**, Jeffreys. Several living and dead specimens of this minute and rare species were found in the dredgings. We here take the opportunity of noting that it has occurred to us at Rothesay, Isle of Man, and Puffin Island. Probably a careful search will show that it is distributed over the whole west coast of Scotland and England, as far south, at least, as the last named locality.

Auriculina insculpta, Mont. (*Odostomia insculpta*). [A.M.N.].

Living and dead in the dredgings, all the specimens being small. Scarce in Clyde district (Brown).

- ** **Eulimella scillæ**, Scacchi. (*Odostomia scillæ*). A fine live specimen, measuring 10 mm., dredged off Fraoich Island.

E. acicula, Phil. [*Eulimella affinis*, A.M.N.]. A dead example dredged off Lismore. Of the var. *ventricosa*, Forbes several were dredged alive and dead. These are remarkably thin, and present none of the microscopic spiral lineation exhibited by the type, the nucleus also being more nearly planospiral. As our knowledge is insufficient we prefer to retain the varietal position for this form at present. Rare in the Clyde district (Brown).

- ** **E. nitidissima**, Mont. A live specimen of this delicate little species was found in the dredgings. Mr. Robertson has taken it in the Clyde district (Brown).

Phasianella pullus, L. [Jeffreys; A.M.N.]. Dredged alive in shallow water near the basaltic cliff south of Oban. Apparently rare or very local.

Cyclostrema nitens, Phil. [A.M.N.]. Common in many of the dredgings. We can find no mention made of the two shallow sinuations which are present in the outer lip, one just above, and the other below, the periphery. This character has been noticed in all the specimens, from many localities, which have been examined.

C. serpuloides, Mont. [A.M.N.]. A few dead examples dredged.

** **C. millepunctatum**, Friele. Three dead specimens dredged off Lismore Island. It is to be hoped that a careful search will be made for this species, of which live examples are to be desired in order both to permit it to take rank indisputably amongst the British Mollusca, and to give an opportunity of examining the operculum and radula, and, if possible, the living animal. We give a short description of one of our specimens, in the hope that it may be of use to others in their search for this the latest addition to our molluscan fauna.

SHELL, a much depressed cone, very thin and transparent; *sculpture* consisting of closely set spiral rows of extremely minute round or oval punctures, which cover every part of the shell; *colour*, white in dead specimens, fresh ones being perfectly hyaline; *spire*, somewhat raised, blunt; *apex* rounded with the nucleus slightly and obliquely twisted; *whorls* $2\frac{1}{2}$, rapidly enlarging, compressed on the sides, the last angulated below the periphery, this angulation bounding the broad sloping umbilical area; *suture* deep; *mouth* squarish; *peristome* thin; *umbilicus* very large, disclosing all the internal spire. Height .6 mm., breadth .8 mm.

This has occurred off the west coast of the Isle of Man, 45 fathoms, and Mr. J. T. Marshall found an example in drift from Southport shore. Friele's specimens, very much larger than ours, were obtained at one station off the west coast of Norway. This comprises all that is at present known of its distribution.

One specimen has the characteristic sculpture obscured by strong close-set lines of growth. The large umbilicus, occupying almost the whole of the under surface, bounded by a distinct keel, affords an easy means of recognition.

- Calliostoma zizyphinus**, L. (*Trochus zizyphinus*). Not uncommon on *Fuci* along the shore. From a rowing boat they could be seen crawling over the weeds at a considerable depth, when the water was calm and the sun shining brightly. A specimen of the var. *lyonsii*, Flem. was dredged off Maiden Island. The var. *humilior*, Jeff. was taken on the shore.
- C. montagui**, Wood. (*Trochus montacuti*). Dredged alive in shallow water off Lismore and Maiden Islands.
- C. millegranum**, Phil. Very common in all the dredgings on hard ground. Most of the specimens are pure white, and when clean some of them are beautifully iridescent. One or two with a much narrower base may perhaps be referred to the var. *pyramidata*, Jeff. *
- Gibbula magus**, L. (*Trochus magus*). [var. *alba*, Jeffreys]. On *Laminaria* in the strait between Fraoich and Kerrera Islands, and off Maiden Island. The only adult specimen obtained alive is almost entirely white, presenting merely traces of colour here and there along the spiral striæ on the body whorl.
- G. umbilicata**, Mont. A few found on *Balanus*-covered rocks and stones along the shore. In some the spire is very much depressed.
- G. cineraria**, L. Very common among *Fuci*.
- G. tumida**, Mont. Common on hard ground.
- Margarita helicina**, Fabr. (*Trochus helycinus*). Immature specimens dredged dead.
- M. grœnlandica**, Chem. [A.M.N.]. Several examples dredged alive in shallow water off Lismore and in Kerrera Sound. The var. *albida*, Jeff. occurred with the type. A single specimen has been taken in the Clyde district (Brown); Loch Leven Ferry (Knight).
- Fissurella græca**, L. Dredged in Kerrera Sound and taken under stones on the shore.

Emarginula crassa, Sow. [Jeffreys ; A.M.N. ; one very fine dredged alive amongst shingle, Loch Etive, R.D.D. MS.]. Two adult and a few smaller ones dredged dead in Kerrera Sound. Thirteen specimens of this fine species were taken alive on loose stones on the shore at extreme low water. One of these is of full dimensions, measuring 33 mm. in length. It was generally noticed that, when the stone had been carefully turned without disturbing the mollusk, the shell was considerably raised, giving a view of the foot and the margin of the mantle. The next species had the shell always kept closely down. Very rare in the Clyde district (Brown).

E. fissura, L. [var. *incurva*, Jeffreys]. Common alive on the shore and in the dredgings on hard ground. Some of the specimens obtained appear to belong to the variety *incurva*, Jeff.

** **Puncturella noachina**, L. A few examples dredged alive and dead off Fraoich and Maiden Islands. Not uncommon in the Clyde district (Brown).

Propilidium ancyloides, Forbes. [20 f., Jeffreys ; A.M.N.]. A few live and dead specimens in the dredgings.

Acmaea testudinalis, Müll. (*Tectura testudinalis*). Moderately common on the shore ; near Dunolly Castle a specimen measuring 24 mm. in length was taken. An example of the var. *pallida*, Verk. was found near Kerrera ferry.

A. virginea, Müll. [Forbes ; A.M.N. ; dredged, very small (var. *conica*) R.D.D. MS.]. Taken on the shore sparingly but of large size, smaller specimens of more conical shape dredged. Among the latter are well marked examples of the vars. *conica*, Jeff. and *elata*, Jeff.

Pilidium fulvum, Müll. (*Tectura fulva*). Two live and four dead specimens dredged in Kerrera Sound.

Patina pellucida, L. (*Helcion pellucidum*). Taken sparingly on *Laminaria*, in the bases of which the var. *laevis*, Penn. occurred.

Patella vulgata, L. Abundant everywhere in the *Laminarian* zone. The var. *picta*, Jeff. occurs with the type.

Acanthochites fascicularis, L. (*Chiton fascicularis*). [var. *attenuata*, Jeffreys; A.M.N.; fine in *Lam.* roots and under stones at Kerrera ferry, F. Archer; R.D.D. MS.]. A few dredged and taken under stones on the shore.

Hanleyia debilis, Gray. (*Chiton hanleyi*). [Jeffreys; A.M.N.]. One came up from 30 fathoms in the Sound of Mull, nestling inside a valve of *Astarte sulcata*.

Trachydermon marginatus, Penn. (*Chiton marginatus*). Several taken on the shore, all of them comparatively small.

Leptochiton cinereus, L. (*Chiton cinereus*). Dredged of the usual size; specimens measuring 19 mm. taken under stones at low water.

L. ruber, L. A few dredged in Kerrera Sound and off Lismore.

Tonicella marmorea, Fabr. (*Chiton marmoreus*). One fine specimen taken on the shore. Another, which was dredged, has the shell remarkably raised along the middle so as to present a prominent keel; when viewed from the end, the angle is seen to equal approximately a right angle.

Callochiton lævis, Penn. [Jeffreys; A.M.N.]. Fine specimens, measuring 24 mm., were taken on stones at low water near Kerrera ferry and on Fraoich Island.

Dentalium entalis, L. Common in mud between Maiden and Lismore Islands.

** **Pulsellum lofotense**, Sars. (*Siphonodentalium lofotense*). A few small specimens in the dredgings from off Lismore. Mr. Robertson has taken it in the Clyde district.

Anomia ehippium, L. Dredged on stones and shells. Fairly common but generally small. Large specimens, measuring as much as 54 mm., taken under loose stones on the shore, where also the var. *aculeata*, Gmel. occurs sparingly.

- A. patelliformis**, L. Both *patelliformis* and *striata*, Lov. occur in the dredgings. We are inclined to regard these as varieties only of the typical species.
- Ostrea edulis**, L. A few valves dredged off Maiden Island.
- Lima hians**, Gmel. Fresh valves dredged in the Sound of Mull and off Maiden Island.
- L. loscombii**, Sow. Valves only taken with those of the last species.
- L. elliptica**, Jeff. Two living specimens and a large number of valves dredged off Maiden Island. The record of *L. subauriculata* given by Forbes is, of course, valueless, as he united that species with the present.
- Pecten maximus**, L. Two adults dredged off Maiden Island, with a few prettily marked young shells.
- P. varius**, L. [*P. niveus* A.M.N. ; R.D.D. MS.]. The type is conspicuously absent. With regard to the *niveus* form the writers are at variance, one considering that it is fully entitled to specific rank, whilst in the opinion of the other the arguments adduced by Jeffreys are too weighty to be lightly discarded. It seems that it ought to be possible to finally settle the question by tracing the species from Oban to Loch Fyne, where, as in the whole Clyde district, the type only occurs, and by noting the presence or absence of intermediate forms. The var. *nivea* is fairly common in the strait between Fraoich and Kerrera, moored by a strong byssus to the surface of the *Laminaria* fronds. The largest specimens obtained measure 63 mm. in length. The large ones are generally more or less *Cliona*-bored. Small examples were found attached to stones on Fraoich Island and on the shore south of Oban.
- P. tigrinus**, Müll. [A.M.N.; frequent, all ages, on *Laminaria* and free, R D.D. MS.]. Dredged sparingly though generally distributed. Most of them belong to the var. *costata*, Jeff.

One pure white specimen and one concentrically marked with alternate bands of white and brown were taken off Lismore.

* *P. incomparabilis*, Risso. (*P. testæ*). [A.M.N.].

P. striatus, Müll. [A.M.N. ; rare, small, R.D.D. MS.]. Dredged in Kerrera Sound and off Lismore. Two of the specimens were remarkably fine. It was generally found attached by a byssus inside valves of *Pecten* and *Modiola*. A specimen dredged off Lismore was adorned with concentric coloured bands similar to those of the *P. tigrinus* noted above.

P. pusio, L. Fairly common in Kerrera Sound and off Maiden Island, generally attached to *Pecten* and *Modiola* valves. One or two large specimens were found free and not distorted.

P. pes-lutræ var. *septemradiatus*, Müll. [Loch Etive, R.D.D.]. Valves occurred sparingly everywhere. One fresh dead specimen off the south end of Kerrera Island. This species seems to be very rarely taken alive in the dredge, and Mr. Brown suggests that it owes its escape to its activity.

P. opercularis, L. Very abundant at certain spots in Kerrera Sound, the dredge frequently coming up filled almost exclusively with this species. The specimens are small and thin, often beautifully coloured—whitish, pink, yellow, orange, red, and brown, the majority being red, generally marbled in various shades. They are generally more or less covered with *Balani* and *Serpulæ*. Some curious conical pink and white objects, generally furnished with three diverging horns, were found adhering to the *Pectens*. The nature of these structures was a matter of doubt until Canon Norman informed us that they were the opercula of *Serpulidian annelids*. Brown records *opercularis* of the same colours as those named from the Clyde district.

- P. similis**, Lask. Not uncommon off Lismore and Maiden Islands. The specimens are beautifully rayed and mottled.
- Mytilus edulis**, L. Attached to rocks and stones on the shore. Small examples of the var. *galloprovincialis*, Lam. occurred wedged in the crevices of the rocks.
- Modiola modiolus**, L. (*Mytilus modiolus*). Dredged in Kerrera Sound, and found under stones at low water on Fraoich Island.
- M. phaseolina**, Phil. A few valves and immature living specimens dredged off Maiden Island. In the Sound of Mull, off Lismore lighthouse, the dredge brought up a large number of valves and several fine living specimens. These were unfortunately lost.
- Modiolaria marmorata**, Forb. A large number, some measuring 20 mm., were taken from the tests of *Ascidians* (*Ascidia mentula* and others). Near Maiden Island these tunicates were crowded with *Modiolariæ*, Mr. Standen being often kept fully occupied in removing them; as many as twenty-seven were taken from an *Ascidian* about five inches long.
- M. discors**, L. [var. *semilævis*, Jeffreys.] A few were taken in Kerrera Sound and off Lismore attached to shells, and in one instance to the base of an *Ascidian*.
- M. nigra**, Gray. Several dredged alive in Kerrera Sound, generally attached amongst masses of *Modiola modiolus*. The largest valve measures 45 mm. in length.
- ** Crenella decussata**, Mont. Dredged alive and dead sparingly.
- Pectunculus glycimeris**, L. [A.M.N.; a few adults dead, some young living, R.D.D. MS.]. A dead specimen with the valves still united off Maiden Island.
- Arca lactea**, L. [Jeffreys; R.D.D. MS.]. One live specimen.
- A. tetragona**, Poli. [A.M.M.] Two dead and worn valves, and a fragment of a valve with the filamentous epidermis attached.

Nucula nucleus, L. Abundant.

N. sulcata, Brown. [Forbes ; A.M.N.]. A few dredged off Lismore and Maiden Islands.

* **N. nitida**, Sow. [A.M.N.].

Leda minuta, Müll. [A.M.N. ; R.D.D. MS.]. Common ; with var. *brevirostris*, Jeff.

Astarte sulcata, Da Costa. Abundant throughout the district, and presenting great variation as regards the size, convexity, and sculpture of the shell. The varieties *scotica*, M. & R., *paucicostata*, Jeffreys, and *minor*, Jeffreys, were taken sparingly with the type. Most of the specimens are more or less thickly encrusted with manganous deposit, especially around the margins.

Astarte compressa, Lin. (*A. sulcata* var. *elliptica*). This was confined to the shallow water in the strait between Fraoich and Kerrera. A few hundred yards away the type is plentiful ; no intermediate forms were taken. We wish to call attention to the important change in the nomenclature given here. Certainly the name *compressa* is far more appropriately applied to this form than to the next.

A. montagui, Dillwyn. (*A. compressa* Mont.). [R.D.D.]. A fine specimen of the var. *striata*, Leach, measuring 18 mm. in length, dredged off Lismore ; valves of the var. *globosa*, Müll. off Maiden Island.

A. triangularis, Mont. A few found in the dredgings.

Kellia suborbicularis, Mont. [A.M.N.]. A large valve dredged off Lismore, and young examples of the var. *lactea* Brown off Maiden Island.

** **Lasæa rubra**, Mont. With the var. *pallida*, Jeff., under stones on the shore and in dredgings from shallow water.

** **Montacuta bidentata**, Mont. Dredged sparingly.

** **Decipula ferruginosa**, Mont. (*Montacuta ferruginosa*). A few valves dredged.

Lepton squamosum, Mont. [A.M.N.]. A worn valve dredged.

** **L. nitidum**, Clark. Two valves dredged in Kerrera Sound.

** **Cardium echinatum**, L. Valves only dredged.

C. edule, L. [A.M.N. ; Lochnell beach near Dunstaffnage, R.D.D. MS.]. In a small sandy bay past Dunolly.

C. minimum, Phil. [Small valves, R.D.D. MS.]. A few small live examples dredged in Kerrera Sound and off Lismore.

C. fasciatum, Mont. Common throughout the district, but generally of small size.

C. nodosum, Turt. [A.M.N.] Dredged alive and dead very sparingly in Kerrera Sound and off Maiden Island.

Lævicardium norvegicum, Speng. (*Cardium norvegicum*.) [R.D.D.]. Valves dredged off Maiden Island.

Cyprina islandica, L. A dead specimen dredged. Alive on Coram Ledge.

Isocardia cor, L. [Between Kerrera and Lismore, Forbes ; A.M.M. ; in the McAndrew collection at Cambridge there is a family of this species, young, middle, and aged, on a card marked Oban. Mr. Anderson Smith, of Ledaig, says Admiral Bedford got this in mud off Lismore and S.E. of Mull on deep sea lines, R.D.D. MS.]. Two valves, one quite fresh, between Maiden Island and Lismore.

Tapes pullastra, L. [A.M.N. ; R.D.D. MS.]. Common on Coram Ledge. The specimens, though agreeing in size and shape with *pullastra*, have stronger sculpture than usual.

T. virgineus, L. Dredged alive, generally of small size. Many of the specimens may be referred to the var. *elongata*, Jeff.

Circe minima, Mont. Dredged alive. Generally distributed but not very common. Almost all the specimens obtained are wholly white.

Dosinia exoleta, L. (*Venus exoleta*). [R.D.D.]. Large dead specimens on Coram Ledge.

D. linctata, Pult. A few dredged alive and dead.

Venus casina, L. Large valves and young live examples dredged.

V. gallina, L. Alive on shore in Oban Bay. Dead on a sandy beach past Dunolly.

V. ovata, Penn. Abundant in all the dredgings on hard ground. Many are of large size.

V. fasciata, Da Costa. [A.M.N.; frequent but not brightly coloured, R.D.D. MS.]. Valves only dredged.

Lucinopsis undata, Penn. Valves dredged.

Cryptodon flexuosus, Mont. (*Axinus flexuosus*). Dredged alive and dead very sparingly.

** **C. ferruginosus**, Forbes. Immature examples, most of them quite unencrusted, dredged alive.

Donax vittatus, Da Costa. [R.D.D.]. A few young shells.

Psammobia ferroensis, Chem. Dead specimens on the beach at Kerrera Island.

P. tellinella, Lamk. [A.M.N.; frequent and rarely living, R.D.D. MS.]. Broken valves and young live specimens dredged.

** **Solecurtus antiquatus**, Pult. Valves only dredged in Kerrera Sound.

Solen siliqua, L. [R.D.D.]. The var. *arcuata*, Jeff. found dead on the shore near Dunolly.

* **S. ensis**, L. In our experience this species merges by imperceptible gradations into the foregoing.

* **S. pellucidus**, Penn. [A.M.N.; R.D.D. MS.].

Mactra solida, L. A valve of the var. *truncata*, Mont. on the shore near Dunolly. The var. *elliptica*, Lamk. was dredged alive and dead. We must confess that it is with considerable hesitation that we retain this in the varietal position to which Jeffreys consigned it. Although specimens from Kerry much thicker than usual have come under our

notice, these are of characteristic form. On the Lancashire coast both are well known, the one littoral and the other at depths of 15—20 fathoms, yet no intermediate forms have occurred to our knowledge.

Mya truncata, L. On Coram Ledge; young shells dredged alive.

Sphenia binghami, Turt. (*Mya binghami*). [A.M.N.] One dredged alive.

Corbula gibba, Olivi. Abundant, and of large size. A few examples of the var. *rosea*, Brown were dredged in mud off Lismore.

** **Saxicavella plicata**, Mont. (*Panopea plicata*). A valve dredged. Very rare in the Clyde district (Brown).

Saxicava rugosa, L. The type and var. *arctica*, L. were taken in *Laminaria* bases, and dredged.

* **Barnea candida**, L. (*Pholas candida*). [Jeffreys.].

* **Zirphæa crispata**, L. (*Pholas crispata*). [Mud under Dunstaffnage Head, R.D.D. MS.].

Lucina borealis, L. Valves dredged.

L. spinifera, Mont. Dredged with moderate frequency in Kerrera Sound. All the specimens are of small size.

* **Tellina crassa**, Penn.

T. tenuis, Da Costa. [R.D.D.]. Young examples dredged.

T. fabula, Gron. [A.M.N.]. A valve dredged.

** **T. donacina**, L. Dead but fresh specimens and valves dredged off Maiden Island.

T. balthica, L. [Very scarce and small, R.D.D. MS.] One or two very young examples dredged.

* **Scrobicularia piperata**, Gmel. [A.M.N.; living on Coram Ledge, R.D.D. MS.].

Abra alba, S. Wood. (*Scrobicularia alba*). Dredged alive in Kerrera Sound.

** **A. prismatica**, Mont. Two valves dredged.

A. nitida, Müll. [Forbes ; A.M.N.]. One dead specimen dredged.

Cuspidaria cuspidata, Olivi. (*Neora cuspidata*). [Off Dunolly Castle, Forbes ; A.M.N.]. Two valves, one quite fresh, dredged in muddy ground between Maiden and Lismore Islands.

Pandora obtusa, Leach. Dredged alive sparingly.

Lyonsia norvegica, Chem. Living specimens and valves dredged off Maiden Island. The largest of the former is produced at the ends, and belongs to the var. *elongata*, Gray.

* **Cochlodesma prætenue**, Pult. (*Thracia prætenuis*). [A.M.N. ; R.D.D. MS.].

* **Thracia convexa**, W. Wood. Mr. H. K. Jordan in lit., August 30, 1893, says : 'Between Maiden Island and Lismore we got many fragments of *Thracia convexa*.'

T. papyracea, Poli. Several valves of the var. *villosiuscula*, Macg. dredged.

Terebratulina caput-serpentis, L. (*Terebratula caput-serpentis*). Abundant in all the dredgings, especially common on clinkers from the steamboats. Several specimens of a rich red colour were taken. A few young ones were found attached to stones at low water near Kerrera ferry and on Fraoich Island.

Crania anomala, Müll. Abundant on stones and shells everywhere on hard ground at all depths, especially so at low water near Kerrera ferry and on Fraoich Island. These littoral specimens attain large dimensions, one measuring 24 mm. across. They were always attached to the under surface of the loose boulders ; those adhering to the more superficial stones were dark in colour, while those on the stones close to the ground were much paler. The var. *alba*, Jeff. was also taken.

THE MOLLUSCAN FAUNA OF THE BOWDON DISTRICT OF CHESHIRE.

BY J. G. MILNE AND CHAS. OLDHAM.

(Read before the Manchester Branch, April 13th, 1893; and before the Conchological Society, September 6th, 1893.)

The district chosen for the purpose of this paper is so much of Cheshire as lies within five miles of Bowdon Church. This may seem to be arbitrarily defined, but it has been taken as fairly typical of the Cheshire plain, and as a region which we have worked with some care. Moreover, it has some natural boundaries; on the north side the river Mersey forms almost a segment of a circle, about four and a half miles from Bowdon, and here our district terminates with the county; and, on the south-west, the limit is practically coincident with the watershed of the Bollin and Weaver rivers. To mark the circle, a few points may be given. It leaves the Mersey at its confluence with the Bollin, passes through Lymm, Northwood Hall, Over Tabley, Lower Knutsford, skirts Lindow Common, and rejoins the Mersey at Gatley Carrs.

Geologically, the district looks unpromising for shells. For the most part the soil is red marl, what stone there is being new red sandstone; a narrow strip of the upper mottled bed extends west from Agden Brow, and the lower Keuper appears, about a mile wide, at Millington, continuing thence towards Lymm, and again from Timperley to Partington in a parallel line of about the same width. The alluvial beds of the Mersey and Bollin cut through the marl, and supply a somewhat better field for the conchologist.

These remarks, of course, apply chiefly to terrestrial mollusca; in water the district is well supplied, and thus the list of species is swollen. There are three large meres—Tatton, Rostherne, and Mere, and considerable sheets of water at

Norbury Booths, and Lymm. Moreover, almost every field has its pit, from which marl was obtained for enriching the land before the days of scientific farming. On the mosses, all now drained, of Carrington, Hale, Baguley, Warburton, Tabley, and Knutsford there are many ditches and pools. The streams of the district all terminate in the Mersey, which is joined first by a brook known successively as Baguley, Sinderland, and Wych Brook, and fed by Fairywell, Timperley, and Caldwell Brooks; then by the Bollin, united with the Birkin, which brings the waters of Ashley and Rostherne Brooks, and with Agden Brook.

A considerable area is taken out of the district for collecting purposes by the growing suburbs of Manchester, Altrincham and Bowdon, and Sale and Ashton, in which the gardens may serve to introduce some new species, but are mostly closed ground to the naturalist. The large parks of Tatton, Mere, Dunham, High Legh, and Wythenshawe also, being preserved, are difficult to work.

For the most part the distribution of mollusca will be found sufficiently indicated in the following pages, but two localities are so particularly fertile that they deserve special mention.

Hampson's Pit is a pond of no great size at Baguley, formed of an old marl pit, with a muddy bottom, overhung by trees on one side, full of different species of water-plants, especially *Anacharis alsinastrium*, and fringed on two sides by rushes. In it have been taken *Planorbis albus*, *vortex*, *umbilicatus*, *corneus*; *Limnæa peregra* and *v. ovata*, *auricularia*, *stagnalis*, *glabra*; *Viviparus contectus*; *Bythinia tentaculata*; *Anodonta cygnea*, *v. zellensis* and *incrassata*; *Sphærium corneum*, *lacustre v. bronchioniana*; *Pisidium fontinale* and *v. henslowana*, *pusillum*, *milium*. *L. glabra* is represented only by one specimen, which had probably wandered in from a neighbouring ditch; and *L. stagnalis* and *V. contectus* are introductions. Still, the list is a notable one, and its interest is increased by the exceptional size to which most of the shells—especially *P. corneus*, *L. stagnalis*, *V. contectus*, *A. cygnea*, *S. lacustre*, and the

Pisidia—grow, a growth which, in the case of the introduced species, can be proved only to have been reached since their introduction.

The other locality has now passed away before the needs of improved farming. Behind Ashley Hall there used to be a small copse, with a marsh at the bottom, where fallen trees rotted at their leisure. Here were found *Arion hortensis*; *Agriolimax agrestis*, and v. *sylvatica*, *tristis*, *lævis*; *Vitrina pellucida*; *Hyalinia cellaria*, *alliaria*, and v. *viridula*, *nitidula*, *radiatula*, *pura*, *crystallina*, *fulva*; *Helix rotundata*, *pygmæa*, *aculeata*, *hispidula* v. *hispidosa*; *Cochlicopa lubrica* and v. *hyalina*; *Succinea elegans*; and *Carychium minimum*, to which may be added *Limnæa peregra* and *palustris*. Mr. Hardy's record of *Vertigo pygmæa* also probably refers to this copse. As these species were almost all in great abundance, it will be seen that Ashley Hall Wood was a happy hunting ground for the conchologist.

Some localities in the neighbourhood of Bowdon have been published in lists of the Manchester District. The following have come under our notice :—

David Dyson.—Shells of the Manchester District. 1850.

John Hardy.—British Terrestrial and Fluvial Mollusca, with the localities of the Manchester species. [Manchester Scientific Students' Association Report.] 1864.

Appendix to above. 1865.

J. Cosmo Melvill.—Mollusca. [In British Association Handbook to Manchester.] 1887.

These will be used, with due notice of the sources, in our list.

It remains to acknowledge our indebtedness to Mr. W. Denison Roebuck for assistance in naming the varieties of slugs, which he has given most kindly; and to Messrs. Thomas Rogers, Edward Collier, R. Standen, J. Ray Hardy, and T. Sparkes for additions and suggestions, which will be distinguished by their names or initials.

We have followed throughout the nomenclature and arrangement of the Conchological Society's List of 1892.

Arion ater. Found sparingly in gardens at Bowdon and Sale, also in the river meadows at Castle Mill, Newbridge, and Sale. Its numbers, if recollection can be trusted, have decreased considerably of late years.

A. ater var. **brunnea.** Not infrequent at Sale and Northenden, also from Ringway and Rostherne.

A. ater var. **succinea.** One young specimen from Ringway.

A. subfuscus. Common; found at Bowdon, Sale, Hale, Northenden, and Ringway. Mr. L. E. Adams has recorded it from Heatley.

A. minimus. Probably generally distributed. We have records from Ringway, Rostherne, Northenden, and Baguley Hall.

A. hortensis. In most places, especially gardens and copses.

A. hortensis var. **subfusca.** Bollington meadows; gardens at Sale.

A. circumscriptus. Found commonly in gardens at Bowdon, Sale and Northenden, and at Dunham Park and Rostherne.

A. circumscriptus var. **subfusca.** One specimen from a lane by Carrington Moss.

Amalia gagates. The rare type form has occurred twice—once at Bowdon and once at Sale, in both cases in gardens.

A. gagtes var. **rava.** One specimen, from a garden at Ashton-on-Mersey.

A. sowerbyi. Near Jackson's boat, on the Cheshire side of the river (Hardy); in gardens at Sale.

Limax maximus. Not often found; in gardens and yards at Bowdon and Sale.

L. maximus var. **cinerea.** Two specimens from Bowdon.

L. maximus var. **cellaria.** Bowdon and Wythenshawe, common at the latter place.

L. maximus var. **fasciata.** Bowdon and Baguley Hall.

- L. flavus.** In nursery gardens at Sale.
- L. arborum.** Mere Park ; once from a garden at Bowdon.
- Agriolimax agrestis.** Common everywhere ; more numerous individually than *Arion hortensis*, and much oftener seen, as the least dampness brings it out to activity in the daytime.
- A. agrestis var. tristis.** Bowdon, Sale, Northenden.
- A. agrestis var. sylvatica.** Almost as common as the type form, but not often found with it. As a rule, the specimens from one locality are fairly constant in colour and markings.
- A. lævis.** Used to be plentiful at Ashley Hall, in the marshiest part of the copse ; still found at Butt's Clough.
- Testacella scutulum.** Mr. Thomas Rogers has specimens from nursery gardens at Sale.
- Vitrina pellucida.** Plentiful in a few localities—at Gatley, Wythenshawe, Ashley Hall, and in the copses by the Bollin at Castle Mill, Butt's Clough, and Ashley Mill.
- Hyalinia cellaria.** Universally distributed through the district.
- H. alliaria.** If possible, commoner than *H. cellaria*, as it displays a greater love for fields and unsheltered places, probably protected by its smaller size and darker colour.
- H. alliaria var. viridula.** Occurs occasionally with the type. We have found it at Bowdon, Ringway, Ashley Hall, and Lymm.
- H. nitidula.** Almost equally common with the last two.
- H. radiatula.** Rather scarce. It has been taken in small numbers at Ashley Hall, Butt's Clough, Hale, Bollington, and Baguley Hall.
- H. pura.** Plentiful where it occurs—at Ashley Hall, Wythenshawe, and Baguley Hall. The prevailing form is the white one (*v. margaritacea* Jeff = type Alder), only in the last locality is the brown variety (= type Jeff.) found with the other.

- H. crystallina.** Fairly common, especially in the Bollin valley at Cotterill Clough, Butt's Clough, Ashley Mill, and Bollington; also at Ashley Hall, Dunham, Wythenshawe, Sale, Baguley Hall, and Gatley (T. S.).
- H. fulva.** Found, though not in great numbers, at several places—Ashley Mill, Castle Mill, Butt's Clough, Hale, Dunham, Rostherne, Sale, Millington, Wythenshawe, Bollington, Gatley (T. S.).
- H. nitida.** Very local—at Millington, Sinderland, and Gatley (R. S.).
- H. excavata.** Not uncommon—at Ashley, Hale, Rostherne, Dunham, Sinderland, Sale, Wythenshawe, and Northenden.
- H. excavata** var. **vitrina** occurs, not associated with the type, in Butt's Clough and at Rostherne.
- Helix rotundata.** Universally distributed throughout the district.
- H. pygmaea.** Found, in fair numbers, among dead leaves at Butt's Clough and Ashley Hall; also near Castle Mill; and at Knutsford (T. R.).
- H. aculeata.** Taken in great plenty at Butt's Clough, one or two at Ashley Hall.
- H. pulchella.** Two specimens taken near Hale Moss; dead shells in flood refuse in Bollington meadows (which must have come from the meadows).
- H. aspersa.** "About the garden fences at Dunham, but not common" (Dyson); "About Bowdon and Dunham, plentiful" (Hardy). Though perhaps introduced to this locality, it still flourishes greatly, more especially in the older gardens.
- H. nemoralis.** "In the neighbourhood of Jackson's boat, on the Cheshireside of the river, upon nearly every hedge-backing as far as Baguley and down to the river Bolling" (Dyson). This species seems to be steadily dying out in this district, as everywhere round Manchester. It has been exterminated by buildings in Bowdon, the last locality being

destroyed in 1885. It still exists, however, in Dunham village, where the usual form is *carnea* 12345; is plentiful at Cotterill Clough and Castle Mill, the commonest types being *libellula* 00000 and *rubella* 00300; and has also been taken at the following localities:—Partington, plentiful in 1886; Wythenshawe, two in 1886; Sinderland, one in 1887; Sale, two in 1886, one in 1887; Northenden, one in 1888; Brownlow Green, two in 1888, two in 1892; river bank, near Northenden church, 1889 (R. S.).

H. arbustorum. “Common in the neighbourhood of Jackson’s boat, Cotterill Clough, Baguley, and near the river Bollin, on the hedge-backings” (Dyson); “Banks of Mersey and Bollin rivers, not very plentiful” (Hardy). This species must have become much scarcer since Dyson’s day. It is still to be found in some numbers at Cotterill Clough, and occasionally at Butt’s Clough, in the Bollin valley; and at Gatley Carrs, in the Mersey valley.

H. arbustorum var. fuscescens. Found at Cotterill Clough with the type.

H. hispida. The type form is rare. Found at Bollington meadows and Gatley (T. S.).

H. hispida var. hispidosa. Common in several localities in the Bollin valley—Morley, Castle Mill, Butt’s Clough, Newbridge, and Bollington; also at Ashley Hall, Jackson’s boat, and Carrington.

H. fusca. Ashley (Rogers in Melvill), Cotterill Clough, among *Luzula sylvatica*, not uncommon; Gatley (J. R. H.), Davenport’s Mill (J. R. H.).

Buliminus obscurus. Found, very occasionally, in the hanging woods below Castle Mill. It is rare to get more than one specimen in half-an-hour’s search.

Pupa cylindracea. “Cotterill Clough” (Hardy). We have not succeeded in finding it here, but the greater part of the clough is now closed.

Vertigo pygmæa. "Near Ashley Mill, and again in the road at the back of Ashley Hall, under dead leaves" (Hardy).

V. substriata. One specimen found at Butt's Clough with the next species.

V. edentula. Very plentiful in Butt's Clough, among dead leaves, especially oak, in the autumn.

Clausilia perversa. "Wall at Dunham Park" (Hardy). Long and frequent searching here has only produced one specimen, on the Bollington wall, but it is fairly common higher up the valley, at Castle Mill, and occasionally occurs at Ashley Mill.

C. laminata. "Cotterill Clough" (Hardy). It is fairly plentiful in the clough, and still more in the copses half-a-mile lower down the river.

Cochlicopa lubrica. Generally distributed, in ditches and copses.

C. lubrica var. **hyalina.** Ashley Hall, Hale.

Succinea putris. "Several varieties are found on the banks of the Mersey, at Jackson's boat" (Dyson), Gatley, Knutsford.

S. elegans. "Banks of the Mersey, at Jackson's boat" (Dyson), Hale Moss, Seaman's Moss (Hardy). The last locality is probably destroyed. The species is still to be found on Hale Moss, and also at Ashley Hall and Bollington meadows, especially on sedges.

Carychium minimum. Occurs sparingly in several places—Castle Mill, Butt's Clough, Dunham, Bollington, Wythen-shawe, and Baguley Hall. We have taken it in great numbers in rotten wood under the bark of a decaying stump at Ashley Hall, associated with *H. crystallina*; and found it equally numerous in a similar stump at Gatley Carrs.

Planorbis fontanus. Fairly common in ponds, with a seeming preference for *Lemnae*—at Ashley Mill, Hale,

Ringway, Dunham, Peelcauseway, Millington, Nothern Etchells.

- P. fontanus** var. *albida*. In the summer of 1885 all the specimens taken in one of the ponds at Ashley Mill were white or light grey, in the previous and succeeding years the same pond only produced examples of the typical colour. No reason for the variation could be discovered.
- P. nautilus**. Ashley, Ringway, Warburton, Ross Mill, Hale. The specimens from the last locality—a small pond in a copse, full of branches and twigs—usually show a pronounced scalariform tendency.
- P. nautilus** var. *crista*. Occurs with the type at Ringway, also at Bow Green and Bowdon Vale.
- P. albus**. Found commonly throughout the district.
- P. spirorbis**. Not uncommon. Found at Hale Moss, Partington, Sale, Northenden, Baguley, Baguley Moor, Davenport's Green, Baguley Hall, and Ashley. It is frequently associated with *Bullinus hypnorum*, while *P. vortex* prefers the society of *Physa fontinalis*.
- P. vortex**. The commonest *Planorbis*, found equally in ponds, ditches, and streams all through the district.
- P. carinatus**. Ashley, Hale, Hale Moss, Peelcauseway, Rostherne, Millington, Knutsford.
- P. umbilicatus**. Much scarcer than the last species; plentiful in the ditches in Sale meadows, elsewhere only in Hampson's pit and a pond near Baguley Hall.
- P. corneus**. Found only in Hampson's Pit, and here perhaps introduced, but thoroughly naturalised.
- P. contortus**. Baguley Hall, Knutsford, and Carrington Moss. The latter locality—a backwater of Sinderland Brook, where it was among *Ranunculus*—has now been destroyed by the Manchester Corporation's improvements.
- Bulimus hypnorum**. Hale Moss, Partington, Baguley Moor, Baguley, and Baguley Hall. In all these localities it is associated with *Planorbis spirorbis*.

Physa fontinalis. "In the ponds on Baguley Moor" (Dyson).
Also at Ashley Mill, Agden, Warburton, Sale Meadows,
and Mere.

Limnæa peregra. Universally distributed and very variable.
Is one of the causes of variation in size of this species to be found in the plants among which it lives? In ponds, especially, where there are large leaved plants, as—*Nymphaea*—the shells are usually large, and frequently covered with green slime, matching the leaves. Among *Potamogeton*, the specimens are smaller; while in ponds where only *Lemna* grows the *Limnææ* are generally slight, and with transparent shells, showing the markings of the mantle. The smallest are found in pools, where there is only confervoid growth on stones, and here they appear unicolourous. (This rule, however, is not universally applicable; in some cases other means of self-preservation seem to have been more efficacious than assimilation to surroundings). The same principle may be applied to the other *Limnææ*.

- L. peregra var. ovata.** Found almost as commonly as the type.
- L. peregra var. labiosa.** A very labiate form occurs at Ringway, which may deserve separate mention.
- L. auricularia.** A few specimens have been taken in Hampson's Pit.
- L. stagnalis.** Sparingly distributed. At Dunham Woodhouses, Agden, Mobberley Mill (now drained), Heyhead, Northen Etchells, Brooklands, and Hampson's Pit. The species was introduced to the last locality from Northen Etchells in 1884, the average length of the specimens at this place being 37 mm. By 1890 they had attained an average of 47 mm. in their new abode.
- L. palustris.** Plentiful and widely distributed.

L. truncatula. Occasionally found, not usually in great plenty. Localities are at Partington, Bollington, Northern Etchells, Ringway, Sale, Baguley, Ashton, and Mobberley.

L. glabra. Very local. Only found in two localities at Baguley, in ditches.

Ancylus fluviatilis. "In a small rivulet of clear water that crosses the road a little before arriving at Baguley Moor" (Dyson). "River Mersey, near Didsbury" (Hardy). It is to be found also in the Bollin at Ashley, in the brook connecting Mere and Rostherne Meres, Baguley Brook, and streams in Bollington Meadows, and Gatley Carrs.

Velletia lacustris. In the Bollin valley, from a pond by Cotterill Clough, and two others in Hale, and at Mere.

Viviparus contectus. "Very abundant in ponds at Sale, Cheshire" (Standen in Melvill). This record refers to Hampson's Pit, where the species was introduced about a quarter of a century ago, from the Twenty Pits, Moss Side, Manchester, then being filled up. We have not been able to see any specimens from this locality, but, if examples from Birch may be taken as probably representing them in size, the shells introduced to Hampson's Pit will have averaged about 32 mm. in length; specimens may now be taken there of 45 mm. or upwards, showing an increase in size very similar to that of *Limnæa stagnalis*. From Hampson's Pit the species has been introduced to two pits in Brooklands (in 1884 and 1888) and one at Baguley Hall (in 1888), in all of which it was still existing last year.

Bythinia tentaculata. Rather uncommon—in Hampson's Pit, Rostherne Brook, and the stream in Bollington meadows.

Valvata piscinalis. River Birkin at Ashley, and its tributary, Rostherne Brook; and Brooklands. From the Birkin come a few rather scalariform specimens.

Anodonta cygnea. "In the ponds at Dunham" (Dyson); "Especially fine and abundant at Lymm" (Melvill). We can verify the latter record, and add Ringway, Ashley, Arden, Wythenshawe, Baguley Brook, Rostherne, and Mere. There is considerable variation among the shells—those from Arden approaching *v. radiata*, those from Ashley *v. pallida*.

A. cygnea var. **incrassata.** Hampson's Pit, where it is very fine; Brooklands, Northen Etchells.

A. cygnea var. **zellensis.** Hampson's Pit, Baguley Moor, Over Tabley.

A. anatina. Very plentiful in some years in Rostherne Brook, in others not to be found; the supply probably comes from the Mere.

Sphærium corneum. Very common, and showing considerable variety.

S. corneum var. **psidioides** Gray. Pond, Rostherne.

S. lacustre. Occurs at Bollington, Dunham, Baguley, Peel-causeway, Sale, and Northen Etchells.

S. lacustre var. **brochoniana.** Hampson's Pit.

S. lacustre var. **ryckholtii.** Ashley and Booth Bank.

Pisidium amnicum. Rostherne Brook and River Birkin, Caldwell Brook, Brooklands, Mobberley.

P. fontinale. "In the ponds on Baguley Moor" (Dyson). It is still found here, and also at Hampson's Pit, Sale Meadows, Ashton, Sale Moor, Brownlow Green, Agden, Mere, Rostherne Brook, and Mobberley.

P. fontinale var. **henslowana.** "Pits on Cheshire side of Mersey, and in a pit on Hale Moss" (Hardy). We find it at Mere, Brooklands, Heyhead, and Hampson's Pit, where it grows to a size of 5×6 mm.

P. fontinale var. **pulchella.** In a pond at Brownlow Green.

P. pusillum. Found almost everywhere, and very variable.

P. nitidum. In four spots near Baguley Hall, all on swampy ground.

P. milium. Very fine at Hampson's Pit, measuring 3×4 mm. ; also at Sale, Baguley, Northen Etchells, Baguley Hall, Ashley Mill, Ashley, and Mere.

In reviewing the list, it will be noticed that there are some gaps among the land molluscs, especially as regards the *Helices*. These are, as has been remarked, to be explained by the character of the soil. *H. rotundata* is the only *Helix* which seems to flourish on the Red Marl. *H. nemoralis* is dying out, and, of the other species found, *pygmæa*, *aculeata*, *arbustorum*, and *hispida* are chiefly found in Cloughs, where leaves and vegetable matter accumulate. *H. pulchella* and *fusca* belong to gravelly or alluvial deposits, and *aspera* is only found on the hill at Bowdon, an isolated sand heap. *Buliminus*, *Pupa*, *Vertigo*, and *Clausilia*, also, are only represented in the valley of the Bollin. On the other hand, we are well off in *Hyalinia*, both as regards the number of species and frequency of individuals. Altogether, while it is possible that one or more species may turn up—*Helix hortensis*, for instance, which is found at Romiley ; *Hyalinia glabra*, found at Marple ; *Valvata cristata*, at Marbury—we believe that we have worked the district fairly thoroughly, and that our total of seventy-four species is practically complete.



Hydrobia jenkinsi Smith in an inland locality.—While dredging in a small branch canal near Dudley, just within the borders of Staffordshire, with my brother, I came across a flourishing colony of *Hydrobia jenkinsi*. With time I could have collected hundreds. They had evidently thoroughly established themselves in the locality for some little time. The specimens have the keel somewhat less pronounced than the type. They were found in company with *Planorbis nautilus* and *Pl. fontanus*.—A. T. DANIEL, November 28th, 1893.

The Dispersal of Shells: An Enquiry into the Means of Dispersal Possessed by Freshwater and Land Mollusca, by Harry Wallis Kew, F.L.S., with a preface by Alfred Russel Wallace.

Kegan Paul, Trench, Trubner & Co. Ltd., 1893. 5/- 8vo, pp. 291.

This work, which forms the 75th volume of the well-known "International Scientific Series," is a welcome and valuable addition to the literature of a somewhat neglected subject, though replete with interest not only to the student of geographical distribution but to conchologists and scientists generally.

The author agrees with the opinion of Darwin, Wallace, and others that the great and repeated changes in the configuration of the earth's surface, solely relied upon by some authors to account for the distribution of organic life, are not always necessary for its explanation, and that in the case of the Mollusca the involuntary dispersal by the aid of man, other organisms, or by the operation of natural forces is, in many cases sufficient to account for their dissemination.

Mr. Kew treats the subject under nine heads, dealing first with what he has termed anomalies in local distribution, instancing the cases of isolated or comparatively newly made bodies of water, which have become possessed in a short time of a special molluscan fauna—the two representative forms that usually seem to be among the first to appear are *L. peregra* and *S. corneum*. The fauna of some of the isolated ponds mentioned are of great interest, sometimes containing species not known to be living elsewhere in the district, and whose presence seem only to be accounted for by the action of one or other of the dispersive means suggested by the author.

The *second, third, fourth, sixth, and seventh* chapters are of special interest, and deal in detail with many of the means of dispersal, and citing numerous well authenticated instances of

mollusca discovered in actual transit from one locality to another by the active aid of other organisms, some of the more interesting methods being carefully figured. Many striking cases of the more usual and better known methods of dispersal are here discussed in detail.

The *fifth* chapter demonstrates the vitality of mollusca, and gives many recorded examples of their remarkable tenacity of life, and of their retention of vitality when submerged in salt water for a length of time sufficient to secure for them an extended distribution under certain favourable circumstances.

The *eighth* and *ninth* chapters deal exclusively with the dispersal of the mollusca by voluntary or involuntary human agency, and in chapter nine is enumerated some of the species introduced into the British list owing to the discovery of specimens on British soil, which had doubtless been introduced into this country by some of the varied means here discussed.

The volume is altogether of especial interest to British Conchologists, as many of the author's most interesting facts, illustrations, and conclusions are derived from observations on British species.



Abnormal *Clausilia perversa*.—Mr. W. Nelson has recently shown me a most curious abnormal specimen of this species found by him at Cooper's Hill, Gloucestershire. The shell has evidently been damaged after attaining its full growth and after roughly repairing the injury, has recommenced to grow as a free tube for a length of six or seven millimetres, exactly simulating the *Cylindrellæ* in this particular. This abnormal growth is entirely deficient of epidermis and seems to be formed entirely by the visceral mantle, bearing out the statement that the glands of collar atrophy on the shell attaining the normal full growth. It is somewhat remarkable that Mr. Nelson has found two specimens of *Helix nemoralis* in the same district, exhibiting a similar character.—JNO. W. TAYLOR, December, 1893.

VARIATION IN THE SHELLS OF THE MOLLUSCA.

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I must commence with an apology for selecting variation as the subject for this evening's address, especially after the demonstrations to which we had the privilege of listening last year in Manchester, when Dr. Norman showed us part of the riches of his vast collections—collections which enable him to survey the shell, if not from 'China to Peru,' at least from that portion of the earth's surface, viz., the whole of the Palæarctic Region, which is best known, most completely explored, and in which the relationship of the indigenous species and varieties have been most thoroughly investigated.

My own horizon is, indeed, a much more humble one, being bounded by the limits of the British Seas.

The theme, although well worn, is of so great and, if we extend our enquiries beyond the limits of the Mollusca to the Vegetable and remainder of the Animal Kingdom, of so absorbing an interest, lying as it does at the root of so many of the problems of Biology, that I hope it may not weary you too much if I devote a short time to a glance at some of the aspects of variation in this class.

Before we can speak of variation or varieties, we must have a standard from which the individual can diverge in some way or another. This leads me directly to the question—What is a species? It must not be forgotten that the species itself is an arbitrary abstraction, no such thing existing in nature. It is a convenience to class many individuals, which possess certain features in common, as one species, although if these individuals be minutely examined, no two specimens will be found to be

exactly alike. Sometimes varieties, acknowledged to belong to the same species, differ much more among themselves than do good species from each other. The distinction generally accepted between species and varieties is that the hybrids between different varieties of the same species are fertile, while the mules resulting from the union of different species are infertile.

Granting the existence of species, the conception of a type is essential. In this connection the word type is used in two different senses.

Strictly speaking, the type is the specimen first described by the original author, but in many cases the species was first described from an aberrant specimen, especially where a describer yielded to the temptation of founding a new species on a single individual, a proceeding always dangerous. The meaning, however, in which I shall use the word this evening is something different, viz., the average individual.

It is a curious fact that the first classification of Animal Variations ever formulated was published by Professor A. Brandt at the last International Congress of Zoology. He divides them into three categories, viz., I. Spontaneous; II. Acquired; III. Hereditary.

- I. The Spontaneous may be (α) strictly individual; (β) proper to the vital cycle; (γ) proper to the sex; (δ) proper to future generations.
- II. The Acquired may be due to (α) external action, mechanical, physical, chemical, or composite; (β) due to function, such as use or disuse; (γ) due to pathological processes; (δ) or correlated with the preceding variations.
- III. Hereditary (α) directly from parents; (β) indirectly by influence; (γ) by atavism from more remote ancestors.—*Journ. R. Micr. Soc.*, 1893.

The formation of new species and varieties by natural selection, or the survival of the fittest, by the gradual accumula-

tion of slight beneficial modifications of the individuals transmitted from parent to offspring includes all these categories. One very interesting example of this has been put on record by Mr. E. S. Morse. As his account is interesting I will quote it.

"On a ledge in the harbour of Eastport (Maine), just east of the town, a small variety of *Buccinum undatum* occurs in great profusion. At the time of collecting them the sexes were pairing, and in every case (and hundreds were observed) the male was much smaller, sometimes not exceeding half the length of the female. It seemed impossible that the males could be mature, and yet they were not only found paired, but an examination of the shell revealed the full number of whorls, and other well-known characters indicated the fact that they were full-grown though of diminutive size.

"A glance at the condition of things at once revealed the mystery of these dwarfed males. The ledge on which these specimens were found is partly exposed at low tide, and is at all times washed by impetuous currents, so that it is quite difficult to land.

"A study of the surface features of the ledge indicated the force of the tidal currents. There were no loose fragments of rock upon it, save those which were so tightly wedged in the crevices of the ledge that they could not be worked out with the hands. The specimens of *Buccina* in every case were found hid away in nooks and concealed in the cracks and crevices marking the ledge. It was clearly obvious that only the smallest males could work their way into such constricted quarters for the purpose of uniting with the female, and, that the smaller males had the advantage over the larger males in this respect there could be no question. The true state of the case was instantly seen, and although hundreds of specimens were collected with the object of determining whether in any case a large male occurred, not a single exception was met with in which the female was not being fertilized by a diminutive male.

"The constrained position in which these were found precluded the possibility of a large male, with his cumbrous shell, getting sufficiently close to the female in her narrow quarters. The smaller males having this advantage, have from generation to generation perpetuated their dwarf characters. It would seem from these facts that natural selection has worked in an unusual way in producing secondary sexual characters, rarely, if ever, seen in the mollusca.

"Both males and females presented a wide range of variation in the character of the shell, some of them showing very distinctly the oblique folds so characteristic of the species, while in others the folds were scarcely visible. The shell of the male is smoother than that of the female, and is also more slender and more delicate."

Certain genera seem to be especially prone to evolutionary influences, or, in other words, the process of evolution has not yet proceeded far enough to produce stable species. This is strikingly exemplified in plants among the brambles, roses, hawkweeds, and willows. Examples among the mollusca are found in the freshwater *Naiad* genera *Unio* and *Anodon*, and in the *Pulmonate* genus *Succinea*.

In plants it is easy to test the effects of change of environment, but for obvious reasons this is impossible among the mollusca. Variation, then, may be simply defined as divergence from the type.

But the time at my disposal will not allow me to enter into any systematic examination of Professor Brandt's subdivisions. The place which the mollusk fills in the kingdom of nature in itself limits the possible number of variations. On the one hand the mollusk has reached a plane of development in which it has climbed above the excessive multiplication of similar organs, as in the *Annelids*, and the stage in which a large number of quasi-independent individuals live in a common Zoecium, as in the Molluscoid Bryozoa. On the other hand,

it has not yet attained to the dignity of distinct limbs, so that many of the forms produced by reduplication, coalescence or suppression are impossible. Again, so many of the group are hermaphrodite, and therefore destitute of secondary sexual characters, that the so-called gynandromorphs cannot be looked for.

Are there Hybrid Mollusca? As far as I know this is a question that has never been satisfactorily answered in the affirmative, but the difficulty or impossibility of applying the physiological test prevents any certain answer being given. Among insects it has been found possible to artificially pair nearly allied species, and so produce undoubted mules, and in the vegetable kingdom, numerous florists' flowers, as is well known, are thus produced.

I do not know that any case of mimicry has been brought forward among the mollusca. By mimicry I mean the protection acquired, as is especially seen among insects, by the assumption of characters similar to those of other species which are distasteful to the creatures which prey upon them, or to inanimate objects like dry stick or parts of plants, some insects, indeed, being quite indistinguishable when at rest upon a plant, from its own leaves and twigs. The only approach to this is the change of colour occurring among the *Cephalopods*, due to the more or less diffusion of the colour in the pigment cells, according to the colour of the ground over which they are swimming. It is quite true that certain specimens, as Mr. Melvill states, of the *Ovulum implicatum*, of Florida, are purple or yellow, as they live among the *Gorgonie* of those colours, but this may be due to the colour of the food. The majority of the mollusca are so little dependent on locomotion for the supply of food that we cannot expect to find varieties such as are developed in other classes by an activity greater or less than the average in the pursuit of prey. There is doubtless a wide field open to anyone who will investigate the variations in the animals themselves, but this is practically an untrodden field

owing to the difficulty of examining them alive. In the first place, the mere fact of the removal from the shell cannot be effected without grave injury, and very few of the marine species can be kept alive for any length of time after their capture, while all preservative fluids distort them so much that they cannot be satisfactorily examined unless by tedious methods of dissection and sectionizing.

Moquin-Tandon, however, describes *Limnæa auricularia* with two heads, and *Physa acuta* with bifid tentacles. My remarks will therefore be restricted to the shell alone, and it is to the shell that most attention has been paid.

The systems of Conchology, at all events all the older ones, are based on the characters which the shell presents. There is no doubt that the form of the shell is intimately correlated with the structure of the animals, although in some cases, if the form of the shell be alone considered, mistakes will be made. To take an example from our own fauna, *Assiminea grayana* would be at once placed in the family *Littorinidæ*, but the animal shows that it belongs to a totally different group.

It is, therefore, necessary in the first place to consider what is the relation of the shell to the animal itself, and how it is formed. The shell is the product of a single organ, viz., the mantle, and all the markings and variations of the shell are produced by corresponding peculiarities of that organ. In the vast majority of cases the shell is external, and is generally large enough to enclose the whole of the soft parts, but in some cases, as in the *Acera* and *Bulla*, part of the animal is permanently external to it.

The *Nudibranchs*, which are all marine, have no shell whatever. In the few cases where the shell is formed in the interior of the animal, as in the *Limaces*, I am not aware that there is much variation either in form or colour in any species, so that I need not further refer to them. In this case only the more important vital organs are protected by the shell. The

molluscan shell differs from the skeletal parts of other animals in the fact that where once formed it is not subject to change and the removal of effete portions, either interstitially as in the *Vertebrata*, or *en masse* as in the *Crustacea*, although the structure is to some extent organised.

As I have just stated, the shell itself is secreted by the mantle or cloak, although there is reason to suppose in some Gasteropods with expanded bases, such as *Cassis*, that the upper part of the foot is also concerned in its formation. The shell is really an excretion, and the body of the animal moves freely over its polished inner surface, except at the insertion of the muscles which are inseparable from the shell during life. The muscles are attached to the shell in different ways. In bivalves there are either one or two transverse muscles which pierce the body, and when contracted overcome the elasticity of the hinge and close the interval between the valves.

In the Mollusca which are covered with a shell in the form of a case or sheath, as in some *Pteropods* and *Gastropods*, the animal is connected to the base of the shell by a large dorsal retractor muscle. In the limpet the muscular fibres are attached all round the shell, and inserted into the edge of the foot, where they interlace with its circular fibres.

The spiral shells are attached to the snail by two muscles attached to the columella, which traverse the mantle and take their origin in the foot. By the examination of the inner side of shells much variety may be seen in the depressions which mark the site of the attachment of the muscles, these being apparently in some cases much stronger than in other examples of the same species, as may be seen in *Capulus*.

I have called the shell an excretion, and so it is, although it exhibits a distinctly organised structure, due to the fact that it is formed by epithelial cells of the mantle and consolidated by the withdrawal of carbonate of lime from the circulating fluids of the animal, but at the same time the living inhabitant exerts

some influence on it, for very shortly after the death of the animal the shell loses many of the characters which distinguished it during life. How this is effected is not known, although at one time there was an idea that vessels passed into the shell among the fibres of the muscles. The first change in a dead shell is for the epidermis or periostrakon to fall off, and the substance of the shell then tends to lose its lustre and become opaque. This might be supposed to be due to the action of the atmosphere on the unprotected element of the shell, but that this is not the only cause is shown by the fact that on the extensive sand hills at Bundoran, with their myriads of individuals of *Helix nemoralis* and *H. hortensis*, it is rare to find a specimen even with a trace of epidermis, yet the shells themselves are as brilliant and translucent examples as can be found anywhere else, as the specimens before you testify. In this case I believe that the epidermis is destroyed by the action of the winds on the sharp angles of the drifting sands.

It is evident that the function of the shell is to protect the soft parts of the animal, and without its protection the life of the mollusk would be a very short one. It also aids in locomotion. Until a few years ago this statement would have been considered to have summed up the whole case. But, here again, as is so generally the case in nature, making a universal statement is only a proof of ignorance, for in the year 1884, the late Professor Moseley made the extraordinary discovery that the shells of some of the *Chitonide* contained not only other organs of sense but also eyes. He first found them in a specimen, preserved in spirit, of *Schizochiton incisus*, and afterwards recognised them in most of the other genera, although they are absent in the genus *Chiton* itself.

These structures are confined to the tegmentum or exposed area of the shells, and are absent from the girdle. The entire substance of the tegmentum is traversed by a series of branching canals, which are occupied in the living animal by corresponding ramifications of soft tissue, accompanied by

abundance of nerves. This network terminates at the shell surface, either in eyes or in peculiar elongate bodies which are probably organs of touch. The soft structures of each eye lie in a pear-shaped chamber excavated in the substance of the tegmentum, and one side of this chamber is pierced by a circular aperture, covered by the cornea which is calcareous.

The cavity is lined by a dark brown pigmented choroid membrane, which, by projecting round the margin of the cornea all round, forms an iris. A perfectly transparent, hyaline, strongly bi-convex lens is fitted in behind the iris aperture; this is composed of soft tissue, and slowly dissolves in strong acetic acid. Some of the fibres of the nerve entering the eye cavity proceed to the retina, while others, perforating the choroid at its outer margin, end at the surface of the shell, all round the area occupied by the cornea.

In some cases the eyes are present in enormous numbers; in one specimen of *Corephium aculeatum*, which was densely covered by a green *alga*, there were something like 12,000 eyes present in good condition, not counting the eyes destroyed by the boring of the shell by *algæ* and animals on the rest of the area. To see these eyes in dried specimens the shell should be wetted with spirit, and examined with a lens as powerful as No. 4 Hartnack. No eyes could be found in any of the fossil specimens in the British Museum collection, although the ancient forms of the group appear to be allied to *Schizochiton*.

The shell, then, is secreted or formed by the glands of the mantle, and may be either calcareous or chitinous in texture. It is first formed by the glands, near the free margin, but all parts of the mantle have the power of secreting the shelly matter, as may be frequently seen in specimens which have been accidentally broken or damaged by the attacks of other animals and afterwards repaired. The variation in the structure of the shell itself is very great, and if I were to enter on the subject it would in itself absorb all the time at my disposal. I may say, however, that the late Dr. Carpenter made a special study of the structure of shells.

In most cases the form of the shell accurately reproduces the form of the mantle, and every fold or projection on the mantle is shown in the sculpture and appendages of the shell. To this rule, however, there are exceptions, where all the processes of the mantle do not secrete shelly coverings, as the *Cerithia* and Oriental *Melania* have delicately digitated mantle margins which are thrown back over the margin of the shell, while in others, as in *Marginella* and *Cypræa*, the lateral lobes of the mantle nearly or completely cover the outside of the shell, which is never covered with epidermis and has therefore that highly polished surface and lustre which give to these shells so brilliant an appearance in our collections. Any injury to the mantle may, therefore, produce a deformity of the shell. In some species the processes on the edge of the mantle seem to be of intermittent growth, and wither away periodically; while present they are protected by a deposition of shelly matter, and in this way the spines and projections found on adult specimens are formed. The spines on different specimens of the same species may vary greatly in delicacy and strength, as is shown in *Cardium aculeatum* and its variety *ovata*; in this variety the spines assume a beautifully arched form.

The colour of the shell, however, is not an index of the colour of the tenant. The shell may be of the plainest appearance while its habitant may be a gorgeous creature, as in the European *Cypræa*—a plain white shell is the home of an animal with a dark vermillion proboscis, yellowish-red tentacula spotted with yellow, with the upper part of the foot streaked longitudinally by yellow and brown, and with the mantle greenish-brown edged with brownish-red. The colouring matter of the shell is confined to the outer layer, the inner laminae being often nacreous or pearly, as may be seen in *Unio pictorum*, when the outer layer has been removed, and is produced by small miliary glands on the edge of the collar of the mantle, the patterns being due to the arrangement of these pigment secreting glands. The object of these brilliant patterns is somewhat mysterious in

many cases, since they can scarcely be seen while the shell is living and until after the epidermis has been removed. There is another way in which patterns are produced in some land shells, viz., where the normally coloured opaque bands become translucent, and allow the dark colour of the animal to show through. These translucent bands show a difference in the structure of these portions of the shell, and are not merely thinner because the pigment cells are absent, as in these cases there are plenty of specimens in which there is the same absence of the pigment cells while the shell itself is not banded in any way. No species shows this better than the common *Helix ericetorum*.

Nature is too fertile in resource to invariably produce the same effects in one way, for the colour and patterns of some species are due to the epidermis, the epidermis being formed in a manner similar to the shelly portion of the mantle. Some *Bulimi* have peculiar epidermis. 'It is a common feature in the Phillipine species,' says Mr. Lovell Reeve, 'that the varieties of pattern which constitute their chief ornament reside only in the epidermis. The colours of the shell rarely describe any kind of configuration. They are mostly blended into a uniform tint, over which a fanciful pattern is produced by the epidermis forming a double porous membrane in some places and a single one only in others, developed moreover with the same continuous regularity as the textile markings of a *Volute* or *Cowry*. This phenomenon is easily detected by immersing the shell in water, when the light portion or upper porous layer of the epidermis becomes saturated, and the ground colour of the shell is seen through it; as the moisture evaporates the epidermis resumes its light appearance. In some cases the epidermis alone gives colour to the shell, and when this is removed the shell is left of a uniform white of greater or less purity.'

While on the subject of colour, it will be convenient to add a few remarks on the subject of colour variation and the way in which it is produced. Speaking generally, shells are the more

brilliantly coloured the more sunshine they get, and the species from the deeper waters of the sea are usually white or light pink in colour. This holds true, not only of the whole shell but also of the different parts of the individuals themselves, that part most exposed to the light showing the brightest colouration; and in those species permanently fixed, the side protected from the light shows none of the patterns which may exist on the exposed surfaces, and the same shell, like some of the *Patellæ* and *Crepidulæ*, may show a difference when they have changed their habitat to a place where they received a more to a less free exposure to light, the markings showing much more either on the younger or older portion of the shell. The most brilliant of all the sea shells are those inhabiting the littoral zone, where we get red, orange, yellow, blue, brown, black, and even white, of much greater purity than in those from greater depths.

In a similar manner, as we near the equator; the colours increase in brilliancy; no one can fail to observe the difference in a number of shells collected from the Northern or from the Tropical Regions. The same thing holds good with land shells. Even in our own seas I have noticed that the colours of the littoral specimens gathered from the shores of Cornwall—in places like Kynance Cove and Newquay—are remarkably brilliant; here there is no mud to foul the water and obstruct the light, the sands themselves being remarkable for their cleanliness and bright colours.

In some cases it is possible that certain colour variations may have influence in protecting them from being preyed upon, and so tend to become predominant in the species.

All mollusca, the shells of which are adorned by patterns, vary much in the disposition of the pigment-producing glands. Thus, *Helix ericetorum* varies from a uniform white, through pink, to a deep brown colour, entirely without markings, while it may have five bands running round each whorl, these bands may coalesce in every possible way, any one may be absent,

they may have sharply defined or serrated margins, and they may be represented by interrupted streaks or dots. The fact that the growth of the shell is spiral tends to produce a banded pattern in the markings in univalve shells. In the bivalves, each valve of these being a flattened spiral, the tendency of the colour markings is to form streaks running from the hinge to the periphery of the shell.

I now come to the subject of the so-called sinistral and dextrorsal varieties or monstrosities. The direction of the spiral is easily observed in the *Gastropoda*, but it is not so easy to recognise the fact that in the *Lamellibranchs* one shell, viz., that to the left when the animal is walking, is a dextral and the opposite one a sinistral spiral. In a few cases the reversal of this rule has been observed, as in two specimens of *Lucina childreni* in the Tankerville collection, and it may be much more frequent than is generally supposed. Among the univalves, the vast majority have a dextral spire, viz., one turning from the left to the right, and which have in consequence the mantle on the right side of the axis; while the species like the *Clausilia* have the spire normally sinistral. That this is not a character of high antiquity is proved by the fact that there may be species in the same genus normally dextral and others sinistral, as among our British *Cerithia*, *reticulatum* and *perversum*. All shells may have the spire reversed, and in the case of *Fusus antiquus* there is the remarkable fact that it is possible to trace the change from a normally sinistral to a normally dextral shell, the former being found in the inhabitants of the seas in which the crag deposits were formed, and the latter in the seas on our own shores. In this case it is not very infrequent to find both dextral and sinistral forms living together, doubtless the results of inheritance. It might be supposed that the numbers of specimens of sinistral *Fusi* and *Buccina* found in collections are due to the large number of specimens collected for food, but in *Littorina littorea*, which is literally collected in millions for the same purpose, only three sinistral specimens are known—two

procured by Mr. Jeffreys in Billingsgate Market, and one by Mr. Rich, which you will see in my drawer to-night; and in *Purpura lapillus*, which is as common or even more universal in its distribution and numbers, only two specimens—one picked up by Mr. Bean's little grand-daughter at Scarborough, and the other by Mrs. Stebbing in North Wales, which latter we had an opportunity of seeing last year in Dr. Norman's collection.

As might be expected, the examples of normally sinistral shells known to show dextral varieties are rarer than the opposite condition, as they themselves are so much fewer in number.

Moquin Tandon, in his work on the European Land and Freshwater Shells, gives five instances, and Jeffreys one, viz., *Clausilia rugosa* var. *dextrorsa*, which is also one of the species mentioned by the French author. To this list I can add one, which you will see this evening, viz., a dextrorsal specimen of *Balea perversa*, from the collection of the Rev. Revett Sheppard, to which he had given the MS. name of *Turbo blandi*.

As to the causes of variation among shells themselves they are almost infinite in number, and I can only glance at a very few.

Among these are abundance or scarcity of food, influencing the size and thus producing geographical races of giants and dwarfs; abundance or scarcity of lime, influencing the thickness or thinness of the shell. Warmth or cold may affect the size in either direction, some shells being much larger in warm and others in colder areas. A remarkable instance of this is given by Johnston, who states that the specimens of *Littorina neritoides* found on the southern slope of Plymouth breakwater, and therefore fully exposed to the sun, are twice the size of any found on the northern face. Exposure to the fury of the elements; the marine univalves which have to resist the effects of the surf are generally squat in form, while those that live in deeper and quieter regions are more elongated and elegant in in shape; this especially applies to different specimens of the same species.

A similar condition may be seen in land shells, as in the large race of *Helix nemoralis* found on the Irish Aran. The

animals are protected by massive shells from the heavy winds and rain coming straight from the Atlantic. Here, again, nature shows that there is more than one means of obtaining the same result, viz., the protection of the individual under the same conditions. The shells of *Helix ericetorum*, which live in myriads on the same rocks, are much thinner, more delicate and elastic than those found on our southern Downs; if heavier, they would more probably be broken, as the plants to which they cling are tossed about by the wind, while the massive shell and the powerful foot of *H. nemoralis* allows it to resist destruction. Again, the massive *Trochus* and the delicate *Homalogyra* are found in the same situation.

Among bivalves Jeffreys draws attention to the parallel case of *Mactra solida* and its variety *elliptica*, forms which exhibited so striking a difference that until recently all conchologists regarded them as distinct species. Again, there can be no better illustration of this than in the common *Anomia*, which, when living a quiet and protected life, has a thin and semi-transparent shell, while in other circumstances it resembles a small oyster from the thickness of its valves. Similar causes affect not only the size but the sculpture of the shells—those exposed to rough usage show little beauty of surface, while those enjoying quieter conditions may be richly adorned with spines or foliaceous scales, as in *Pinna rudis* among bivalves, out of which many so-called species have been manufactured, simply from differences in the spines and sculpture of the shell; and *Purpura lapillus* var. *imbricata* among univalves.

Does age affect the size of shells? This is a question which I cannot answer definitely. I am inclined to think not. The *Anodons* procured by Mr. Heathcote have been thought to owe their immense size to advanced age, but specimens of *Unios* found in quiet lakes, and bearing marks of extreme age, are of no more than the average size. M. Picard published a paper in the Bulletin of the Linnean Society of Normandy in 1840 on the changes induced by age in the *Unios*. Owing to

the closing of the library of the Zoological Society during the month of September, I regret that I am unable to show this paper to-night. For the majority of species there is a certain area in which the shell exhibits its most typical form and in which it is most numerous. Beyond these limits it is more apt to vary and to form races and varieties. Of course where it is most abundant it is more common to find monstrosities, either due to injury or freaks of development, as ovate shells becoming acuminate like *Buccinum undatum* var. *acuminata*, globose shells disciform as in *Helix nemoralis* var. *planospira* of Picard, in which the whorls are depressed until it resembles a *Planorbis*. The whorls also may be partially or completely disjointed so as to produce turreted, scalariform, or even ceratoid forms like a ram's horn, as in the specimen of *Helix aspersa* in the drawer before you.

Monstrosities may also be produced by external injury, as where a *Unio* has the valves partly fastened together by the byssus of *Dreissena*; and in an individual of *Helix terrestris* in the British Museum, which has a small stick passing through it; and in my *Helix hortensis* which, when small, got into a nut-shell, and not only carried it on its back during the remainder of its life, but also partly utilized it in the growth of its shell. At Montpellier *Helix aspersa*, deprived of its shell, was placed in the upper parts of the shells of *Paludina* and *Ianthina communis*, and a perfect compound shell thus formed like the specimens exhibited.

Johnston records the occurrence of an oyster in the Firth of Forth in which the interference of three corallines growing near its edges distorted it so that it resembled an ace of clubs. Again, the effects of injury may be to render necessary the disuse of a mouth and the formation of a new one—*Clausilia* have been described furnished with as many as four mouths.

Boring mollusca and shells which are closely applied to other surfaces, such as *Anomia* and *Capula*, also show considerable variation due to these causes. You will see *Anomia*

in the drawer which completely reproduce the markings of the *Pectens* to which they are attached. Other causes of variation and distortion are the mixture of fresh and salt water, and the chemical action of the water in which they live. This frequently produces decollated forms. Parasites are not much responsible among the mollusca for monstrosities, but, as Canon Norman showed last year, an annelid is responsible for deforming *Buccinum undatum*, whilst numberless parasites may be harboured by some species, a certain stage in the development of the sheep fluke by *Limnæa truncatula*, without leaving any external mark. The mechanical effects of the erosions caused by algæ, sponges, and boring mollusca are easily distinguishable, and do not produce marked varieties. To take an instance of the way in which a species may vary, nothing can be better than our common *Purpura lapillus*. It may vary in size—be a giant, medium-sized, or dwarf, have the shell thick or thin, the spire elongated or shortened, be dextral or sinistral, have the lower whorls hollowed, compressed, or ventricose, the mouth narrowed or expanded, the teeth of the peristome prominent or obliterated; the surface, quite smooth, be marked by strong spiral ridges or plates alone, by longitudinal ridges alone, have both longitudinal and spiral striæ producing cancellæ, or be covered by beautiful foliaceous plates. If specimens be examined taken from the crag, it will be found that in the seas of that epoch the sculpture was even more prominent than in those procured from our own seas. In colour, again, it may be absolutely white, both inside and outside, or uniformly coloured on each surface in various tints of yellow, brown, and black, or be adorned in different ways by variously coloured bands. The suture may also be almost filled up or obliterated in some species, or be channelled, or the whorls carinated.

Time has not permitted me to do more than glance at the different causes of variation and at the results produced, and many more will, without doubt, at once occur to you.

Now, one word as to varietal names. Although

Names are good, for how, without their aid,
Is knowledge gained by man to man conveyed ?

It is possible out of a large number of specimens of the same species to pick out examples which contrast strongly with one another, and to label them with distinctive names.

In the arrangement of a large collection, however, these names, which at first seem to be a means of accurate description, become a source of confusion, as every gradation may be observed to exist between the different forms. This, however, is a mere matter of convenience, and every one must be a law to himself.

In these days, nearly all work except that done by the microtome and microscope, is looked down upon as somewhat unworthy of serious attention, although, with the present perfection of mechanical appliances, no work is much easier than that of section-cutting. I believe that the work, humble though it may be, of those who examine the alterations of external form have a distinct and useful place in the study of nature, if only to prevent the microtommist from treating dissimilar forms as distinct species, while they are essentially the same. No one is competent to undertake the discrimination of allied forms who has not been exercised in what an American writer well called 'the dead work of science,' that is, the examination and separation of large numbers of specimens. I recently read an offer, by a gentleman, of a large amount of material dredged in the Indian Ocean, to any one who would thoroughly work it, as he was unable to do so himself. This offer was, however, accompanied by a notice that 'No species-maker need apply.'

When the dust-heaps of science come to be riddled and the dross separated from the ore, I have no fear that as large a proportion of the work done by the species-maker and variety-monger will prove to be as good metal as that brought forward by the pedigree-maker and the so-called philosophical naturalist. The epoch-making labours of Darwin depended on the observation of small differences ; and he who has first thoroughly

elucidated a single species, either in its life history or in its variations of form, has erected a 'monumentum ære perennius,' and, although he may be unknown to fame, he has fashioned a stone necessary to the completion of the building of the perfected Temple of Nature.

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CONSTITUTION (AS AMENDED SEPTEMBER 16TH, 1893) OF
THE CONCHOLOGICAL SOCIETY.

- 1.—This Society shall be called "**The Conchological Society of Great Britain and Ireland.**"
- 2.—Its objects shall be the promotion of the science of Conchology, by the holding of Meetings for the reading and discussion of original papers, by the publication of proceedings, and by the formation of a Library and Collections illustrative of the science.
- 3.—It shall consist of Ordinary and Honorary Members.
- 4.—Ordinary Members shall be proposed by two Members at one meeting, and balloted for at the next. They shall pay, in advance, on the 1st January in each year, a subscription of 5/-, or may compound for life by the payment of Three Guineas. Foreign Members shall pay an annual subscription of 7/6.
- 5.—Composition Fees shall be invested in Books, Cabinets, or other permanent property, or in such other manner as the Council may think most conducive to the benefit of the Society.
- 6.—Members shall have the privilege of appending to their names the initial letters M.C.S. (Member of the Conchological Society).
- 7.—The number of Honorary Members shall be limited to ten, and they shall be exempt from all payments and have the privileges of Ordinary Members.
- 8.—It shall be governed by a Council, consisting of a President, four Vice-Presidents, a Treasurer, a Secretary, a Curator, a Recorder, a Librarian, and six other members, who shall be elected annually by ballot; the voting paper issued to be returned to the Secretary, under cover of sealed envelope, addressed to the Scrutineers. The President and Secretary of the Manchester Branch shall, *ex officio*, also be members of the Council of the Society.
- 9.—The Presidency shall not be tenable for more than one year continuously, and the President is expected to give an address.
- 10.—The meetings shall be held monthly, at the time and place fixed by the Council, who shall have also power to arrange such additional meetings as they may think desirable.
- 11.—Three shall be a quorum at all meetings.
- 12.—The Annual Meeting shall be held at such time and place as may be fixed at the previous Annual Meeting, to receive the Reports and Balance Sheet of the out-going Council, and to elect a Council and Officers for the ensuing year.
- 13.—The accounts, before being presented, shall be audited by two members, appointed at a previous meeting.
- 14.—The proceedings shall be published periodically, under the direction of the Council.
- 15.—The Capital and Property shall be vested in two Trustees, elected by the Society.
- 16.—No alterations in the rules shall be made, unless by a majority of three-fourths of the members present at a meeting which has been specially summoned.

LIST OF MEMBERS.

(With year of election; O = founder, or original member; L = Life Member,
who has compounded for his subscription).

HONORARY MEMBERS

(Limited to ten in number).

1889. Bergh, Prof. Dr. Rud., Vestre Hospital, Stormgade, 19, 2, Copenhagen.
 1889. Binney, Wm. G., 222, E. Union St., Burlington, New Jersey, U.S.A.
 1889. Cossmann, Maurice, Ingénieur-chef des services techniques du chemin
de fer du Nord, 95, Rue de Maubeuge, Paris.
 1889. Crosse, Hippolyte, Rue Tronchet, 25, Paris.
 1878. Kobelt, Dr. Wilhelm, Schwannheim, Frankfort-am-Main.
 1886. Martens, Dr. Eduard von, C.M.Z.S., Paulstrasse, Berlin, N. W.
 O Nelson, William, Gandy Row, Crossgates, Leeds.
 1889. Philippi, Dr. R. A., Director del Museo Nacional, Santiago, Chile.
 1889. Sars, Prof. G. O., Universitat, Christiania, Norway.
 1889. Simroth, Dr. Heinrich, Gohlis, Leipzig.

ORDINARY MEMBERS.

1891. Adams, Gerald Wheatley, M.R.C.S., L.R.C.P., Elmfield, 122,
Moseley Road, Birmingham.
 1885. Adams, Lionel Ernest, B.A., 77, St. Giles Street, Northampton.
 1889. Agius, Paul, B.A., 106, Strada Reale, Valetta, Malta.
 1892. Alletsee, Albert Gregory, 40, Milward Crescent, Hastings, Sussex.
 1891. Ancey, César Felix, Membre de la Société Malacologique de France,
Member of Colorado Biological Association, Membre de la
'Societas Entomologica' de Zurich, etc., Administrateur-
Adjoint, Boghari, Algeria.
 1888. Bailey, Rev. George, F.R.M.S., The Manse, Finchingfield, Essex.
 1886. Baillie, William, Brora, near Golspie, Sutherlandshire.
 1889. Baker, Arthur Edwin, 1, Bridlesmith Gate, Nottingham.
 1886. Barnacle, Rev. H. Glanville, M.A., F.R.A.S., The Vicarage,
Holmes Chapel, Crewe, R.S.O.
 1887. Beaulah, John, Ravensthorpe, Brigg, Lincolnshire.
 1891. Beckett, James Benjamin
 1888. Bell, Alfred, 78, Wells Street, Oxford Street, London.
 1886. Bendall, Wilfrid, 77, Baker Street, Portman Square, London, W.
 1884. Bostock, Edwin D., The Radfords, Stone, Staffordshire.
 1879. Brazier, John, F.L.S., C.M.Z.S., Curaçoa House, 82, Windmill
Street, Sydney, N.S.W.
 1893. Brierley, Mrs. H. G., Glen View, Gledholt, Huddersfield.
 1887. Brown, Alfred, 7, Bowmont Terrace, Glasgow.
 1890. Burkill, Isaac Henry, Caius College, Cambridge.
 1888. Burrows, Thomas F., 4, Wellington Road, Newark-on-Trent.
 1879. Butterell, J. Darker, 4, Willow Grove, Westwood, Beverley.
 1888. Byne, Loftus St. George, 5, Sea View Terrace, Teignmouth, Devon.

1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne.
 1893. Carphin, Mrs. Janet, 1, Lauriston Park, Edinburgh.
 1878. Cash, William, F.G.S., F.R.M.S., 38, Elmfield Terrace, Halifax.
 1892. Champ, Henry, c/o S. & J. Watts & Co., Portland St., Manchester.
 1887. Chaytor, R. C., Scrafton Lodge, Middleham, Bedale, Yorkshire.
 1889. Christy, Robert Miller, F.L.S., Pryors, Broomfield, near Chelmsford, Essex.
 1893. Clark, James, M.A., Ph.D., Ass.R.C.S., Yorkshire College, Leeds.
 1886. Coates, Henry, F.R.S.E., Pitcullen House, Perth.
 1885. Cockerell, T. D. A., F.Z.S., F.E.S., Agricultural College, Las Cruces, New Mexico, U.S.A.
 1880. Collier, Edwd., 1, Heather Bank, Moss Lane East, Oxford Road, Manchester.
 1887. Cooke, Rev. Alfred Hands, M.A., F.Z.S., King's College, Cambridge.
 1892. Cooper, James Eddowes, 93, Southwood Lane, Highgate, London, N.
 1886. Coulson, Frank, Greenhead Brewery, Greenhead, Glasgow.
 1888. Cox, Chas. Stanley Bell, B.A., M.R.C.S., San Remo, Chelston, Torquay.
 1886. Craven, Alfred E., F.G.S., F.Z.S., 65, St. George's Road, Warwick Square, London, S.W.
 1892. Craven, Henry Ernest, Matlock Bridge, Derbyshire.
 1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
 1889. Crawshaw, Rev. Charles, Wesley Villa, Saltburn-by-the-Sea.
 1886. Crick, Walter D., 7, Alfred Street, Northampton.
 1888. Crouch, Walter, F.Z.S., Grafton House, Wellesley Road, Waustead, Essex.
 1893. Crowther, Henry, F.R.M.S., The Museum, Leeds.
 1879. Cundall, J. W., 21, Elgin Park, Redland, Bristol.
 1886. DaCosta, Solomon J., 2, Craven Hill, London.
 1888. Dale, Henry F., A.A., B.Sc., F.R.G.S., F.R.M.S., F.Z.S., F.E.S., etc., Post Office, Estabrook, Park Co., Colorado, U.S.A.
 1888. Dale, (Mrs.) Violet, P.O., Estabrook, Park Co., Colorado, U.S.A.
 1888. Dale, (Miss) A. M., Hatherley, Bampfylde Rd., Torquay, Devonshire.
 1892. Daniel, Arthur Trevelyan, M.A., Richmond Terrace, Shelton, Stoke-on-Trent.
 1886. Darbishire, Robert D., B.A., F.G.S., Victoria Park, Manchester.
 1889. Dawson, Oswald, Caledonian House, Leeds.
 1891. Dawson, Robert Southworth, 4, Richmond Rd., Bradford, Yorkshire.
 1888. Dewick, Rev. Edward S., M.A., 26, Oxford Square, London, W.
 1892. Dixon, James Bassett, 15, Bushell Place, Preston.
 1886. Dodd, B. Sturges, 67, Beech Avenue, New Basford, Nottingham.
 1886. Duncan, W., 31, Mill Lane, Montrose, Forfarshire, N.B.
 1892. Eccles, John Christopher, 20, Winckley Square, Preston.
 1891. Elgar, Hubert, 3, St. Michael's Terrace, Fant Road, Maidstone, Kent.
 1884. Elliot, Edward J., High Street, Stroud, Gloucestershire.

- 1888. Evans, (Mrs.) A., sen., Brimscombe Court, Thrupp, near Stroud.
- 1886. Eyre, Rev. W. L. W., M.A., Swarraton Rectory, Alresford, Hants.
- 1889. Falloon, (Mrs.) Beatrice J., Long Ashton Vicarage, Clifton, Bristol.
- 1891. Farrer, Captain Wm. James, Chapel House, Bassenthwaite, Keswick.
- 1890. Fierke, Frederick Wm., 52, Francis Street West, Hull.
- 1887. Fitzgerald, Francis R., F.S.Sc., 26, Great Percy Street, Pentonville, London, W.C.
- 1884. Fitzgerald, H. Purefoy, North Hall, Preston Candover, Hants.
- 1886. Fitzgerald, (Mrs.) J., 10, West Terrace, Folkestone, Kent.
- 1888. Fortune, Riley, F.Z.S., Ravensgill, Franklin Mount, Harrogate.
- 1892. Fulton, Hugh, 216, King's Road, Chelsea, London, S.W.
- 1886. Gain, Wm. Albert, Tuxford, Newark, Notts.
- 1887. Galizia, Joseph Sylvester, M.D., 65, Strada Vescovo, Valletta, Malta.
- 1889. Gaskell, Roger, M.A., 5, The Grove, Highgate, London, N.
- 1887. Gatto, Alfred Caruana, B.A., 59, Strada Levante, Valetta, Malta.
- 1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., etc., Accrington, Lancashire.
- 1886. Godlee, Theo., Whips Cross, Walthamstow, Essex.
- 1886. Greene, Rev. Carleton, M.A., Great Barford Vicarage, St. Neots.
- 1890. Grocock, Leonard Oakley, 21, Beckenham Road, Penge, London.
- 1890. Gude, G. K., 5, Giesbach Road, Upper Holloway, London, N.
- 1892. Guppy, R. J. Lechmere, 26, Queen's Terrace, Port of Spain, Trinidad.
- 1886. Gwatkin, Rev. Prof. H. M., M.A., 8, Scrope Terrace, Cambridge.
- 1891. Hadow, Gerald Elliot, South Cerney Vicarage, Cirencester.
- 1886. Hagger, John, F.L.S., Repton School, Burton-on-Trent.
- 1888. Halstead, John J., 19, Millholme Terrace, Carlisle.
- 1887. Hanley, Sylvanus, F.L.S., Hanley Road, Hornsey Road, London, N.
- 1887. Hargreaves, J. A., 40, Ramskill Road, Scarborough, Yorkshire.
- 1889. Hartley, Alfred, 8, Cavendish Road, Idle, near Bradford, Yorkshire.
- 1887. Harvard, T. Mawson, 16, Radford Road, Hither Green, Lewisham, London, S.E.
- 1891. Hawell, Rev. John, M.A., Vicarage, Ingleby Greenhow, Middlesbrough.
- 1891. Hawes, Alfred, Penistone, Yorkshire.
- 1887. Heathcote, Wm. Henry, 54, Frenchwood Street, Preston.
- 1889. Hedworth, Thos. H., 1, Railway Terr., Dunston, Gateshead-on-Tyne.
- 1888. Heitland, (Mrs.) M., Colkirk, Fakenham, Norfolk.
- 1892. Henshall, Joseph, Ivy Cottage, Barton-on-Irwell, near Manchester.
- 1878. Hepburn, Frederick, B.A., Sutton, Surrey.
- 1887. Hey, Thomas, Bloomfield Street, Derby.
- 1887. Hey, Rev. Wm. Croser, M.A., Derwent House, West Ayton, Seamer, York.
- 1893. Hill, J., Little Eaton, near Derby.
- 1886. Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
- 1886. Hockin, (Miss) S., Phillack Rectory, Hayle, Cornwall.
- 1888. Hodgson, (Mrs.) Julia, Chalgrave Vicarage, Leighton Buzzard, Beds.
- 1886. Holmes, W. J. O., F.L.S., Strumpshaw Hall, Norwich.

1891. Horsley, Rev. J. W., Holy Trinity Vicarage, Woolwich.
 1884. Howell, George O., 210, Eglinton Road, Plumstead, Kent.
 1892. Howorth, Sir Henry Hoyle, K.C.I.E., M.P., F.S.A., etc., Bentcliffe House, Eccles, Manchester.
 1886. Hoyle, W. E., M.A., M.Sc., M.R.C.S., F.R.S.E., Keeper of the Manchester Museum, Owens College, Manchester.
 1883. Hudson, Baker, Public Library, Middlesbrough-on-Tees.
 1886. James, John H., A.R.I.Cornwall, 3, Truro Veau Terrace, Truro, Cornwall.
 1886. Jenkins, A. J., 6, Douglas Terrace, Douglas Street, Deptford, London, S.E.
 1891. Jenner, James Herbert Augustus, F.E.S., 4, East Street, Lewes.
 1888. Jones, Wm. Jas., jun., 27, Mayton Street, Holloway, London, N.
 1889. Jordan, H. K., F.G.S., The Knoll, Clytha Park, Newport, Monmouthshire.
 1887. Kew, H. Wallis, F.Z.S., 5, Giesbach Road, Upper Holloway, London, N.
 1889. Knight, G. A. Frank, M.A., Rosenlauri, Bearsden, Glasgow.
 1891. Lamb, Henry, Lime Villas, Bower Street, Maidstone, Kent.
 1879. Laver, Henry, M.R.C.S., F.L.S., Trinity Street, Colchester, Essex.
 1892. Layard, Edgar Leopold, C.M.G., F.Z.S., etc., Otterbourne, Budleigh Salterton, South Devon.
 1878. Leicester, Alfd., 1, Priory Gardens, Weld Rd., Birkdale, Southport.
 1886. Lightwood, James T., Hope House, Lytham, Lancashire.
 1889. Linter, (Miss) J. E., Arragon Close, Twickenham, Middlesex.
 1886. Lowe, Edward Joseph, D.L., J.P., F.R.S., F.L.S., F.G.S., F.R.A.S., etc., Shirenewton Hall, Chepstow, Monmouthshire.
 1887. Luther, S. M., Garrettsville, Ohio, U.S.A.
 1891. Lyons, Lady, Kilbrough, Swansea, Glamorganshire.
 1889. MacAndrews, James J., Lukesland, Ivy Bridge, Devonshire.
 1885. McKean, Kenneth, F.L.S., Lloyds, London, E.C.
 1886. McMurtrie, Rev. John, M.A., D.D., 5, Inverleith Place, Edinburgh.
 1884. Madison, James, 167, Bradford Street, Birmingham.
 1885. Marquand, Ernest D., Fermain House, Guernsey.
 1887. Marshall, J. T., Sevenoaks, Torquay, Devonshire.
 1887. Masfield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
 1888. Mason, Philip Brooke, J.P., M.R.C.S., F.L.S., F.Z.S., Horninglow Street, Burton-on-Trent.
 1889. Mayfield, Arthur, 88, Stafford Street, Norwich.
 1887. Mellors, George W., 10, Notting Hill Square, London, W.
 1880. Melvill, James Cosmo, M.A., F.L.S., Kersal Cottage, Prestwich, Manchester.
 1891. Middleton, Robert, Gledhow, near Leeds.
 1888. Milne, J. Grafton, Mansfield House, Canning Town, London, E.
 1879. Milnes, Rev. Herbert, M.A., Winster Vicarage, near Derby.
 1891. Mitchell, James, 240, Darnley Street, Pollokshields, Glasgow.
 1891. Morris, Cecil Herbert, Lewes, Sussex.

1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
1887. Newstead, A. H. L., B.A. Cantab., Roseacre, Epping.
1891. Newton, Richard Bullen, F.G.S., 7, Melrose Gardens, West Kensington Park, London, W.
1890. Nicholson, John, Chapeltown, Pudsey, Yorkshire.
1891. Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., F.L.S., etc., Burnmoor Rectory, Fence Houses, Durham.
1887. North, S. W., M.R.C.S., F.G.S., Micklegate, York.
1887. Oldham, Charles, Ashlands, Ashton-on-Mersey, Cheshire.
1889. Paling, Albert, B.A., B.Sc., Middlesex Hospital, London.
1882. Parke, George H., F.L.S., F.G.S., St. John's, Wakefield.
1887. Parry, Lieut.-Col. G. S., 18, Hyde Gardens, Eastbourne, Sussex.
1888. Peal, Charles Nathaniel, F.L.S., F.R.M.S., Fernhurst, Mattock Lane, Ealing, London, W.
1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock, Oxfordshire.
1892. Petch, Tom, B.A., 10, All Saints' Street, King's Lynn.
1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
1885. Quilter, Henry E., 34, Sparkenhoe Street, Leicester.
1888. Radcliffe, John, 111, Oxford Street, Ashton-under-Lyne.
1886. Ramage, John, 20, Hill Street, Dundee, Forfarshire, N.B.
1887. Reader, Thomas W., F.G.S., 171, Hemingford Road, Barnsbury, London, N.
1885. Redding, J. Roland, 31, Belvedere Road, Dublin.
1887. Renton, Robert, Fans Road, Greenlaw, Berwickshire, N.B.
1888. Rhodes, Frederick, 16, Moorland Place, Leeds Road, Bradford, Yorkshire.
1888. Robertson, David, F.L.S., F.G.S., Fernbank, Millport, Great Cumbrae, N.B.
1892. Robinson, Charles, 29, Stretford Road, Manchester.
- O Roebuck, Wm. Denison, F.L.S., Sunny Bank, Leeds.
1886. Rogers, Thomas, 27, Oldham Road, Manchester.
1893. Roseburgh, John, 54, Market Street, Galashiels.
1892. Rosevear, John Burman, 5, Pomona Place, Poole Park, Fulham, London, S.W.
1893. Rosevear, Samuel Blackman, 122, West Street, Fareham, Hants.
1893. Rufford, Philip James, 1, Cloucester Place, The Croft, Hastings.
1877. Scharff, Robert F., Ph.D., B.Sc., M.R.I.A., Curator of the Natural History Museum, Dublin; 22, Leeson Park, Dublin.
1893. Scharff, W. E., Hillcrest, Ripon Road, Harrogate.
1886. Scott, Thomas, F.L.S., 14, Lorne Street, Leith, N.B.
1893. Shackelford, Lewis John, Ripley College, Ripley, Derbyshire.
1887. Shaw, Alexander, 439, St. Vincent Street, Glasgow.
1892. Shillito, John G., 20, Elmore Road, Sheffield.
1886. Shrubsole, George Wm., Town Hall Square, Chester.
1884. Skilton, (Mrs.) Mary, 21, London Road, Brentford, Middlesex.
1886. Smart, Rev. R. W. J., M.A., Parkham Rectory, Bideford, N. Devon.

1886. Smith, Edgar A., F.Z.S., Nat. History Museum, South Kensington, London, W.
1892. Smith, Mrs. Louisa J., Monmouth House, Monmouth Street, Topsham, Exeter.
1886. Smout, Charles L., 141, Burdett Road, London, E.
1886. *Z* Somerville, Alexander, B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow.
1887. Somerville, Rev. James E., M.A., B.D., 11, Southpark Terrace, Hillhead, Glasgow.
1886. Sowerby, Geo. Brettingham, F.L.S., 121, Fulham Rd., London, S.W.
1892. Span, Bartlet, Heywood Mount, Tenby, South Wales.
1886. Standen, Robert, 40, Palmerston Street, Moss Side, Manchester.
1888. Stanley, Frederick, Rokeby, Edgar Road, Margate, Kent.
1886. Steel, James, (Glass Stainer), 104, Renfrew Street, Glasgow.
1888. Stirrup, Mark, F.G.S., High Thorn, Bowdon, near Manchester.
1888. Storrs, Rev. George Godwyn. B.A., Laurel Cottage, Florence Road, Southsea.
1885. Storey, J. A., B.A., St. Joseph's, High School, Cardiff.
1890. Stubbs, Arthur Goodwin, Sherwood Rise, Nottingham.
1893. Stump, Edward Constadine, 16, Herbert St., Moss Side, Manchester.
1888. Sykes, Ernest Ruthven, B.A., 9, Belvedere, Weymouth, Dorsetshire.
1886. Taylor, (Miss) Helen L., Woodside, Rowditch, Derby.
1887. Taylor, J. M., Free Museum, Paisley, Renfrewshire, N.B.
O Taylor, John W., F.L.S., Spring Bank, Horsforth, Leeds.
1886. Tomlin, J. R. Brockton, B.A., 59, Liverpool Road, Chester.
1886. Turner, Rev. William, 5, St. Andrew's Square, Edinburgh.
1880. Tye, G. Sherriff, 10, Richmond Road, Handsworth, Birmingham.
1886. Viner, C. W., M.A., Ph.D., 9, Seymour Street, Bath.
1890. Warren, (Miss) Amy, Moyview, Ballina, Co. Mayo, Ireland.
1891. Walker, Bryant, 18, Moffat Building, Detroit, Michigan. U.S.A.
1885. Waters, A. H., B.A., Willoughby House, Mill Road, Cambridge.
1886. Watson, Rev. Robert Boog, B.A., F.R.S.E., F.L.S., Free Church Manse, Cardross, Dumbartonshire.
1888. Whatmore, Charles A., Much Marcle, Herefordshire.
1886. Whitwell, Wm., F.L.S., 4, Thurleigh Road, Balham, London, S.W.
1893. Williams, Ernest W., Boif Street, Bridgetown, Barbados, B.W.I.
1889. Williams, John M., 4, Exchange Alley, Liverpool.
1891. Williamson, Rev. Charles Arthur, M.A., Old Benwell Villas, Newcastle-on-Tyne.
1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
1893. Wood, Chas. Ed., 41, Darlington Street, Wolverhampton.
1886. *Z* Woodward, Bernard B., F.G.S., F.R.M.S., 131, The Grove, Ealing, London, W.
1886. Wotton, F. W., 11, Moira Terrace, Cardiff, Glamorganshire.

ANNUAL REPORT FOR 1893.

Your Council in presenting their Report for the year 1893, have again to congratulate the members upon a year of quiet and uninterrupted progress.

The membership, which stood at 220 at the date of the last Annual Meeting, is now 223, composed of 10 honorary life members, 13 ordinary members resident abroad, and 200 ordinary members on the home list.

Ten new ordinary members have been elected during the year, and the vacancy in the honorary life membership has been filled up by the election of Mr. William Nelson, one of the four members by whom the Society was founded in 1876. Four members have resigned, and three have died, namely, Mr. A. J. R. Sclater, of Teignmouth; Mr. J. W. Davis, Mayor of Halifax; and Mr. G. W. Shrubsole, of Chester.

Ten meetings have been held since the last Annual Meeting, all at Leeds, and a large number of interesting exhibits have been made at all the meetings.

The following papers and notes have been read :—

Lionel E. Adams—‘The Examples of *Zonites cellarius* in the Montagu Collection at Exeter.’

Edgar A. Smith—‘Description of a New Species of *Nucula*, and a List of the Species belonging to the sub-genus *Acila*.’

J. Cosmo Melville—‘Notes upon *Cypræa chrysalis*, and upon *C. amphithales*.’

C. Oldham—‘Additions to the South Devon List of Land and Fresh-water Mollusca.’

F. W. Wotton—‘The Life-History of *Arion ater* and its power of Self-fertilization.’

Lionel E. Adams—‘A Theory as to the Possible Introduction of *Hydrobia jenkinsi*.’

Robert F. Scharff—‘*Helix nemoralis* in the Pyrenees.’

W. Nelson and R. Standen—‘Observations on the Misplacement of the Names of Type and Variety in *Hyalinia pura*’ (Alder).

Loftus St. G. Byne—‘The Marine Mollusca of Teignmouth.’

Charles Oldham—‘Note on *Pisidia* near Leicester.’

J. E. Cooper—‘Note on *Valvata piscinalis* monst. *sinistrosum* at Hunstanton.’

R. J. Lechmere Guppy—‘The Land and Freshwater Mollusca of Trinidad.’

Rev. Herbert Milnes—‘List of the Land and Freshwater Mollusca of the Peak of Derbyshire.’

Lionel E. Adams—‘*Hyalinia glabra* in Northamptonshire.’

Rev. J. W. Horsley—‘*Helix nemoralis* in the Pyrenees.’

J. T. Marshall—‘Additions to British Conchology.’

Rev. J. McMurtrie—‘Egg Shells: Additional Notes on the Land and Freshwater Mollusca of the Island of Egg.’

C. H. Morris—‘*Valvata piscinalis* var. *albina* at Lewes, Sussex.’

C. H. Morris—‘*Albino* varieties at Lewes, Sussex.’

Heinrich Simroth—‘Some Remarks with respect to Mr. Wotton’s paper on the Life-History of *Arion ater*.’

J. Cosmo Melville—‘On a variety of *Cypræa cruenta* Gmel.’

G. A. Frank Knight—'Contributions towards a List of the Marine Mollusca of the Upper portion of Loch Linnhe, Argyllshire.'

J. E. Cooper—'Note on *Helix pisana* in the Channel Islands.'

J. G. Milne and C. Oldham—'The Molluscan Fauna of the Bowdon District of Cheshire.'

All these papers and notes have appeared or will shortly appear in the 'Journal of Conchology.' It will be seen that the members of the Society pay attention to Conchology in its broadest sense, and that the papers read show evidence of original investigation on diverse branches of the science.

Four numbers of the 'Journal of Conchology' have been issued to the members during the past year, and another is nearly ready for issue. The arrangements for the issue of the Journal made with the Editor have continued as in past years, and your Council recommend their continuance.

The Society's Collections, which are deposited in the Museum of the Leeds Philosophical and Literary Society, and are in part displayed for public inspection, have been materially added to during the year. Among the donations special attention may be called to a large series of Marine Shells from Sutherlandshire, presented by Mr. Wm. Baillie, a fine set of Marine and Land and Freshwater Shells from the neighbourhood of Ballina, Ireland, by Miss Amy Warren; an additional set of Egg Shells, by Rev. J. McMurtrie; a series of Shells from the Copford Pleistocene Deposit, by Mr. W. Thomson; a large number of Marine Shells from the Channel Isles, by Mr. J. E. Cooper; a number of shells from the Revett Sheppard Collection, by the President (Mr. P. B. Mason); a series of fine examples of Marine Shells collected at Viareggio, Italy, by Mrs. J. Fitzgerald; and a large number of specimens of Marine, Land and Freshwater Shells from various localities, by Mr. Jno. W. Taylor; besides donations of smaller extent from the late Miss Fairbrass, Rev. W. C. Hey, Messrs. Lionel Hinxman, W. Denison Roebuck, Geo. Roberts, L. E. Adams, J. E. Mason, G. T. Lyle, C. H. Morris, C. Oldham, W. Howard, H. Barker, and H. Richardson.

The Society has also received donations in money towards the Cabinet Fund from Mr. Hubert Elgar, Lieut.-Col. Parry, and Rev. W. L. W. Eyre; and Mr. J. Basset Dixon has kindly presented a new Cabinet, which is to be devoted to the reception of specimens of British Marine Mollusca—and will be known as the 'Dixon Cabinet.'

The Curator will always be glad to receive donations of Shells for the Collections under his charge.

The Library has increased during the year by numerous donations, and by a few purchases of standard works on the science of conchology. The donations received have been from Canon Norman, Messrs. W. Denison Roebuck, W. H. Dall, C. Hedley, B. B. Woodward, R. B. Newton, C. T. Simpson, Jno. Brazier, J. C. Melville, F. W. Wotton, L. E. Adams, W. Moss, P. B. Mason, Dr. Simroth, R. J. Lechmere Guppy, R. Standen, and T. D. A. Cockerell, in addition to the periodicals and publications of Societies received in exchange for the Journal of Conchology.

Photographs have been received from Messrs. J. E. Cooper and Wm. Moss, the latter of whom has contributed a number of photographs of anatomical preparations.

The office of Hon. Librarian has been vacant the greater portion of the year, owing to Mr. Edgar R. Waite having removed to Australia on his appointment to a post in the Australian Museum at Sydney. The Library has been moderately well used during the year, about 200 books and pamphlets having been borrowed during the year.

The reports of the Treasurer and of the Manchester Branch are appended.

Treasurer's Report.

My Annual Report for 1893 represents the society in the same position as that for the previous year. The receipts of subscriptions are, by a coincidence, precisely the same (£45 10s.); and the balance of £3 18s. 6d. is again nominal, as there remain Nos 7 and 8 of the Journal to be paid for. The amount of arrears—nearly £30—must probably be considered a bad debt.—LIONEL E. ADAMS, Hon. Treasurer, 77, St Giles' Street, Northampton, *February 21, 1894.*

BALANCE SHEET.

GENERAL FUND.

<i>1893, Dec. 31.</i>	Receipts.	£	s.	d.
	Brot. forward from 1892	4	8	7
	Subscriptions received in 1893	45	10	0
	Sale of Journals, Lists, and Reprints	2	10	1½
	Bank Interest	0	2	0

£52 10 8½

<i>1893, Dec. 31.</i>	Payments.	£	s.	d.
	*Cost of Journals (Nos. 3, 4, 5, 6)	29	0	9
	Secretary's Expenses ...	7	16	3
	Treasurer's do. ...	2	5	5½
	Stationery	4	17	9
	†Transferred from Cabinet Fund of last year	1	0	6
	Rent of Room and Gratuity to Porter at Leeds	1	0	6
	Books bought	2	11	0
	Balance in hand	3	18	6

£52 10 8½

*Nos. 7 and 8 still unpaid.

CABINET FUND.

<i>1893, Dec. 31.</i>	Receipts.	£	s.	d.
	Balance from 1892 ...	3	19	9½
	†Wrongly entered as payments by Cab. Fund last year	1	0	6
	Donations in 1893 ...	1	5	0
	To sale of Tubes... ..	0	0	8

£6 5 11½

<i>1893, Dec. 31.</i>	Payments.	£	s.	d.
	To Boxes, &c., for Mounting... ..	2	19	8
	On account for Cabinet bought	2	10	0
	Ditto	0	15	0
	Balance in hand	0	1	3½

£6 5 11½

LIONEL E. ADAMS,

HON. TREASURER.

Feb. 27, 1894, examined and found correct,

WILLIAM MOSS, F.C.A. } AUDITORS.
ROBERT CAIRNS, }

REPORT OF THE MANCHESTER BRANCH.

SEPTEMBER 16TH, 1893.

MR. PRESIDENT AND GENTLEMEN,

During the past year the Manchester Branch has steadily increased in strength. We have lost one member by death and one by resignation, but eight new members have been elected, and we now number forty-five.

The monthly meetings have been extremely well attended, and the interest shown in the proceedings is unabated. Numerous specimens have been exhibited, and, together with the numerous notes and papers contributed, have been full of interest, and given occasion for much discussion and interchange of ideas and information amongst the members.

At the Annual Meeting of the Branch, held in the Owens College on May 13th, the members made a capital exhibition of special groups of Mollusca, principally marine, from Foreign as well as British shores. This extension of their field, besides increasing the interest of the members in the ordinary business of their meetings, will doubtless prompt the scientific study of British as well as Foreign Mollusca and their distribution.

The following Notes and Papers have been read :—

By Mr. W. E. Hoyle, M.A. : ‘A description of the animal of *Nautilus pompilius* L. ;’ and ‘On the Luminous Organs of certain Cuttlefishes.’

By J. Cosmo Melvill, M.A. : ‘On a variety of *Cypræa cruenta* Gmel. ;’ and ‘Preliminary Remarks on a Collection of Marine Shells from Lifu, Loyalty Islands, recently presented to the Owens College Museum.’

By Messrs. W. Nelson and R. Standen : ‘Observations on the Misplacement of the Names of Type and Variety in *Hyalinia pura* Alder.’

By Messrs. J. Grafton Milne and Charles Oldham : ‘The Molluscan Fauna of Bowdon and District.’

By Mr. L. St. George Byne : ‘An account of the occurrence of *Pleurobranchus membranaceus* Mont., in Teignmouth Bay.’

By Mr. R. Standen : ‘Land and Freshwater Mollusca collected around Portsalon, County Donegal, Ireland.’

By Messrs. R. Standen and J. Ray Hardy : ‘The Land and Freshwater Mollusca of Oban and District and the Island of Lismore.’

The general collection of British Land, Freshwater, and Marine Mollusca in the Cabinet placed at the service of the Branch by the Owens College authorities has been largely increased by the donations of members and friends, and the specimens have been temporarily arranged. It is hoped in course of time to have the entire collection catalogued for more ready reference by the members.

The Library of the Branch has received several valuable donations of useful conchological works from various members.—R. STANDEN, Hon. Secretary Manchester Branch.

CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND.

PROCEEDINGS.

217th MEETING (ANNUAL MEETING), SATURDAY, 16th SEPT., 1893,

Held at Burton-on-Trent, by kind invitation of the President, Mr. Philip B. Mason, F.L.S.

At 1-30 p.m. the President's Museum and general collections were on view to the members at his residence, Trent House, Bridge Street.

At 4 p.m. the members were entertained by the President to tea in one of the rooms attached to St. Paul's Institute.

After tea, his fine collection of Mollusca of the British Islands and Seas was shown, having previously been specially arranged for exhibition in the spacious large room of the Institute. It contained over 25,000 specimens of British Shells, the collection being especially formed to show the range of variation in each species in size, form, sculpture, and colour—long series of littoral shells from different localities having been collected for this purpose. Amongst them the following were especially noticeable:—Very full series of all the species of *Teredo*; unusually fine and perfect *Thracia convexa* and *pubescens*; a great many of the *Odostomia* collected by Mr. W. Clark at Exmouth, from which he described the animals in his book; good series of *Buccinum* and *Fusus*, including two *Fusus fenestratus*, viz., one of the original Cork specimens, and the other a living shell dredged by Jeffreys off Valentia; very long series of their varieties and monstrosities; all the best specimens collected by W. W. Walpole of Dublin from the Irish coast; all specimens which were worth acquisition from the Leckenby collection, including those dredged with Jeffreys in their joint Shetland expeditions; among others, sinistral specimens of *Littorina littorea* and *Helix ericetorum* and a dextral *Balea perversa*; among the land and freshwater shells are the collection made in the earlier part of the century by Pickering around London in numerous localities now destroyed; and the whole collection of the Rev. Revett Sheppard, including the types described by him in the Linnean Transactions.

In addition to the President's collections, there were a number of exhibits by the following members:

Mr. B. Sturges Dodd, of Nottingham, showed a collection illustrative of the following species of *Teredines*: *Teredo norvegica*, *T. navalis* and var. *occlusa*, *T. pedicellata*, *T. megotara*, var. *onionata*, var. *subericola*, *T. malleolus*, *T. bipinnata*, *T. fimbriata*, and *Xylophaga dorsalis*, including an example of a submarine telegraph cable having been attacked and perforated through gutta-percha, the outer steel casing and other protections having been removed; also a portion of fossil wood perforated by *Teredines* from London clay-deposits, Isle of Sheppy. Mr. Dodd also had a collection of Otoliths, and various other interesting objects.

Mr. J. R. B. Masefield, M.A., exhibited *Dreissensia polymorpha* from the Colwich Canal, *Linnaea peregra* var. *ampullacea* from near Cheadle, and

the albino forms of three species, viz., *Limnæa auricularia* from the Canal, Colwich, *L. stagnalis* from Milford near Stafford, and *Buliminus obscurus* from Weaver Hills near Cheadle—all in Cheshire.

Mr. William Nelson showed a fine series of distortions of *Limnæa peregra* from Allerton Bywater near Leeds.

A number of large examples of *Anodons* were shown by Mr. W. H. Heathcote, and malformed specimens of *Limnæa stagnalis* from the Derby Canal by Mr. Thomas Hey; and other exhibits were made by Mr. James Madison and Mr. G. Sherriff Tye of Birmingham.

At 6 p.m. the Annual Meeting was held in the large hall of the St. Paul's Institute.

The chair was occupied by the President, Mr. Philip B. Mason, J.P., F.L.S., etc.

The attendance included about forty or fifty members and friends, including Messrs. Wm. Denison Roebuck, F.L.S., Hon. Secretary; Lionel E. Adams, B.A., Hon. Treasurer; William Nelson, Hon. Curator; W. E. Hoyle, M.A., F.R.S.E., and John Wm. Taylor, F.L.S., Vice-Presidents; R. D. Darbishire, B.A., F.G.S., John R. B. Masefield, M.A., James C. Melvill, M.A., F.L.S., Members of the Council; Robert Standen, Hon. Secretary, Manchester Branch; A. E. Baker, Thomas F. Burrows, Edward Collier, Walter D. Crick, A. T. Daniel, M.A., B. Sturges Dodd, Thomas Hey, James Madison, and A. G. Stubbs; and some members of the Burton-on-Trent Natural History Society were present as visitors.

The minutes of the 216th Meeting were taken as read and confirmed.

Appointment of Scrutineers :

Messrs. W. D. Crick and B. S. Dodd were appointed to examine the voting-papers.

Annual Reports :

The Annual Report of the Council (which had previously been distributed in proof form among the members present) was taken as read.

The Hon. Treasurer read an interim statement as to the financial position of the society, and mentioned that the Council had recommended that, on account of the year having been a short one of about nine months, the making-up and auditing of the complete Balance Sheet should be deferred to the end of the calendar year [the financial statement has since been made up accordingly, and is printed with the Annual Reports at p. 355].

The Annual Report of the Manchester Branch was read by its Honorary Secretary, Mr. Robert Standen.

The Reports and Recommendations of the Council were adopted unanimously, on the motion of Mr. Edward Collier, duly seconded.

Alteration of Rules :

In accordance with notice given, it was moved by Mr. W. Denison Roebuck, F.L.S., seconded by Mr. Lionel E. Adams, B.A., and unanimously resolved, that the following words be added to Rule 8 :

‘The President and Secretary of the Manchester Branch shall, ex-officio, also be members of the Council of the Society.’

Election of Office-Bearers :

Mr. B. S. Dodd reported on behalf of himself and co-Scrutineer, that they had received forty-one voting-papers, none of which had been invalidated by any informality; and that the following members had received the highest number of votes for the respective offices :

For PRESIDENT: Mr. ROBERT F. SCHARFF, Ph.D., B.Sc., Dublin.

For VICE-PRESIDENTS: Mr. W. E. HOYLE, M.A., F.R.S.E., Manchester; Mr. PHILIP B. MASON, J.P., F.L.S., Burton-on-Trent; Rev. A. MERLE NORMAN, LL.D., F.R.S., Burnmoor; Mr. JOHN W. TAYLOR, F.L.S., Leeds.

For HON. SECRETARY and RECORDER: Mr. W. DENISON ROEBUCK, F.L.S., Leeds.

For HON. TREASURER: Mr. LIONEL E. ADAMS, B.A., Northampton.

For HON. CURATOR: Mr. WILLIAM NELSON, Leeds.

For HON. LIBRARIAN: Mr. HENRY CROWTHER, F.R.M.S., Leeds.

For the COUNCIL: Mr. R. D. DARBISHIRE, B.A., F.G.S., Manchester; Mr. J. R. B. MASEFIELD, M.A., Cheadle; Mr. J. COSMO MELVILL, M.A., F.L.S., Manchester; Mr. R. BULLEN NEWTON, F.G.S., London; Mr. JOHN PONSONBY, F.Z.S., London; Rev. R. BOOG WATSON, B.A., F.R.S.E., Cardross, N.B.

The President having declared these members duly elected to the respective offices, the Secretary announced that he was in receipt of letters from Dr. Scharff and Mr. Ponsonby expressing their wish not to serve the offices to which they had been elected, and that another vacancy on the Council was caused by the operation of the alteration in rule giving Mr. Darbishire an ex-officio seat on the Council.

Whereupon it was moved by Mr. J. C. Melvill, seconded by Mr. R. Standen, and unanimously resolved that Mr. W. E. Hoyle be elected President in place of Dr. Scharff, that Mr. Masefield become Vice-President in succession to Mr. Hoyle, and that Messrs. Edward Collier of Manchester, J. T. Marshall of Torquay, and Charles Oldham of Manchester, become members of the Council in the room of Messrs. Darbishire, Masefield, and Ponsonby.

Place of next Annual Meeting :

The newly-elected President, Mr. Hoyle, then gave the Society an invitation to hold the Annual Meeting of 1894 in Manchester, and the invitation was cordially accepted, a motion to that effect being duly proposed, seconded and carried.

The Presidential Address

was then delivered by the retiring President, Mr. P. B. Mason, J.P., F.L.S., etc., who took as his subject: 'Variation in the Shells of the Mollusca' [the address has since been printed in the 'J. of C.,' Jan. 1894, pp. 328-346].

At the conclusion of the address it was moved by Mr. R. D. Darbishire, B.A., F.G.S., seconded by Mr. J. R. B. Masefield, M.A., and unanimously resolved, that the best thanks of the Society be tendered to the retiring President for his services during the year, the address just delivered, and his hospitable reception of the Society upon the occasion of its holding a meeting at Burton-on-Trent.

MANCHESTER BRANCH.

Meeting held at Owens College, Sept. 14th, 1893.

The President, Mr. R. D. Darbshire, in the chair.

New Members Elected :

Mr. G. W. Chaster, 42, Talbot Street, Southport.

Mr. P. W. Abbot, 44, Brasenose Street, Manchester.

Paper Read :

'The Land and Freshwater Mollusca of Oban and the Island of Lismore,' by Messrs. R. Standen and John Ray Hardy.

Donation to Library :

By Mr. Chas. Oldham : A copy of Brown's Mollusca, for which the thanks of the meeting were tendered to him.

Exhibits :

By Messrs. Standen and Hardy : A mounted series of the shells described in their paper, which were afterwards presented by them to the Cabinet of the Branch.

By Mr. R. D. Darbshire : *Spirula peronii* taken on the Donegal coast this year ; young *Isocardia cor*, and two remarkably fine specimens of *Fusus islandicus*, recently obtained in Carmarthen Bay. Mr. Darbshire presented the *F. islandicus* to the Cabinet, a most acceptable addition to the collection.

By Mr. R. Cairns : *H. hortensis*, *H. rotundata*, distorted *Cl. rugosa*, and *Vertigo substriata*, from Isle of Man. The *Vertigo* is an addition to the Manx list.

By Mr. W. Moss : *Cylindrella trinitaria*, with perfect apices, and *Cyclotus translucidus*, from Trinidad ; and a very fine series of *H. hortensis*, *H. lapicida*, *H. cantiana*, and *Cyclostoma elegans*, collected by himself at Christchurch Road, Hants.

By Mr. Chas. Oldham : Fine specimens of *Unio tumidus*, from Marbury Mere, a new Cheshire locality for this species.

By Mr. F. Taylor : Specimens of *Bulimus*, *Orthalicus*, and *Ampularia* from British Guiana ; and a series of very beautiful *Helix rotundata* var. *alba* from near Woolwich.

By Mr. R. Standen : *H. concinna* from Ballintrae, co. Antrim, found living about two feet above high water tide mark on wet rocks on the shore ; *P. muscorum* from Bundoran, co. Donegal ; a large series of white-mouthed *H. nemoralis* var. *hyalozonata* from the Bundoran sandhills ; and a beautiful set of *Ianthina rotundata*, all collected by Mr. Brockton Tomlin during last August. Mr. Tomlin obtained the *Ianthinas* alive in considerable quantity, thrown up on the shore at Ballintrae.—R. STANDEN, Hon. Sec.

218th MEETING, WEDNESDAY, OCTOBER 4th, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., vice-president, in the chair.

Library Purchase announced : A Contribution to the Geology and Natural History of Nottinghamshire, by J. W. Carr, M.A., 1893 (containing a full list of the mollusca by Mr. B. Sturges Dodd).

Donations to the Library announced and thanks voted : From the Society : Evkönyve, 1892-3 Jahreshefte des Naturwissenschaftlichen Vereines des Trencséner Comitates, 1893, with plates.

From the respective Editors : The British Naturalist and the Naturalist for October.

Donations to Cabinet Fund announced and thanks voted : From Dr. R. F. Scharff and Mr. J. G. Milne, five shillings each.

Donations to Collections announced and thanks voted : From Mrs. Janet Carphin : *Hyalinia nitida* and *Carychium minimum* from Faldonside, Roxburghshire ; *Helix aculeata*, *H. pygmaea*, and *Buliminus obscurus*, from Elwand, near Melrose, Roxburghshire ; *Valvata piscinalis*, *V. cristata*, *Pisidium milium*, *P. pusillum*, *Physa fontinalis*, *Planorbis albus*, *Pl. contortus*, *Pl. fontanus*, *Limnaea palustris*, *L. peregra* var. *lacustris*, and *L. auricularia* var. *acuta*, from Faldonside Loch, Roxburghshire ; *Helix hispida* and var. *albida*, *Pupa cylindracea*, *Succinea elegans*, *Pisidium fontinale*, *Limnaea palustris*, *Planorbis contortus*, *Hyalinia nitidula*, *H. nitida*, and *H. pura* var. *margaritacea*, from Clovenfords, Selkirkshire ; *Vertigo edentula*, from Craigiehill Wood, Linlithgowshire : and *Helix pygmaea* and *Planorbis nautilus* from Dalmeny, Linlithgowshire, all being new authentication-records for their respective counties.

New Member Elected :

Mr. James Clark, M.A., Ph.D., Assoc.R.C.S., Lecturer in the Yorkshire College, Leeds.

Decease of Member :

The death of Mr. G. W. Shrubsole, F.G.S., of Chester, was announced ; and it was resolved that the Secretary convey to the family an expression of sympathy at the loss which they and the Society have sustained.

Paper Read :

A paper by Messrs. R. Standen and J. Ray Hardy, which had previously been read before the Manchester Branch, upon 'The Land and Freshwater Mollusca of Oban and the Island of Lismore' was read [and has been printed in the 'Journal of Conchology,' October, 1893, pp. 266—274].

Exhibits :

On behalf of Mr. J. R. Brockton Tomlin, B.A., were shown a number of slugs from the Island of Guernsey, including a deep reddish-brown and a nearly white example of *Amalia gagates*, as well as typical specimens of that species and of *A. carinata*, *Limax flavus*, *Arion hortensis*, *A. ater* var. *marginata*, and *Limax maximus* var. *cellaria*.

MANCHESTER BRANCH.

Meeting held at Owens College, October 12th, 1893.

The President, Mr. R. D. Darbshire, in the chair.

Donation to Library :

By Mr. J. W. Taylor : A number of Reprints of Papers from the 'Journal of Conchology,' for which a vote of thanks was tendered to the donor.

Paper Read :

'The Marine Mollusca and Brachiopoda of Oban,' by Dr. G. W. Chaster and Mr. W. H. Heathcote.

Exhibits :

By Messrs. Chaster and Heathcote : Series of the 195 species described in their paper.

By Mr. G. W. Chaster : Fine sets of the following species :—*Buccinum undatum* vars. *flexuosa*, *setlandica*, and *alba*, from Shetland ; monst. *acuminatum* and other unnamed varieties and monstrosities from Whitstable ; *Fusus antiquus* var. *striata* and *Fusus bernicensis*, from Bristol Channel ; *Fusus gracilis* and var. *convoluta* from Isle of Man, var. *coulsoni* from Shetland, and var. *belliana* from Bristol Channel ; *Fusus norvegicus*, *Scaloria trevelyana*, *Trochus occidentalis*, *Natica islandica*, and *N. grønlandica*, from North Sea.

By Mr. T. Rogers : Varieties of *Buccinum undatum* from several British localities.

By Mr. A. T. Daniel : Live *Hydrobia jenkinsii* from canal at Wolverhampton—a new British locality.—R. STANDEN, Hon. Sec.

219th MEETING, WEDNESDAY, NOVEMBER 1st, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., vice-president, in the chair.

Donations to the Library announced and thanks voted : From the late Author : Histoire Malacologique du Lac Tanganyika, par J. R. Bourguignat, and Iconographie Malacologique des Animaux Mollusques Fluviaux du Lac Tanganyika, par J. R. Bourguignat.

Donations to Collections announced and thanks voted.

From Mr. Arthur G. Stubbs : Specimens of *Sphærium rivicola*, *S. corneum*, *Bythinia tentaculata*, *B. leachii*, *Valvata piscinalis*, *Planorbis carinatus*, *Pl. vortex*, *Pl. corneus*, *Pl. umbilicatus*, *Neritina*, and *Limnaea auricularia* from the Nottingham Canal.

From Mr. J. G. Milne : Slugs from Montenegro.

From Dr. R. F. Scharff : Specimens of extended mollusca killed by acetic acid.

From Mr. T. F. Burrows : *Limnaea auricularia* from the tanks at Kew.

Papers Read :

A paper on the 'Land and Freshwater Molluscs of East Norfolk' by Rev. S. Spencer Pearce, M.A., and Mr. Arthur Mayfield was read [and will be printed in a forthcoming number of the 'Journal of Conchology'].

A paper by Mr. G. B. Sowerby, F.L.S., F.Z.S., on the 'Marine Shells of South Africa' was read [and is published in the 'Journal of Conchology,' April, 1894, pp. 368—378].

A paper by Messrs. G. W. Chaster and W. H. Heathcote on 'Dredging at Oban,' which had been previously read before the Manchester Branch, was read [and has been printed in the 'Journal of Conchology,' January, 1894, pp. 289—312].

A communication from Dr. R. F. Scharff was also read, in which he indicated a ready method of distinguishing between *Limax maximus* and *L. marginatus* (*arborum*). By touching the front part of the mantle in *L. maximus* with a pencil or forceps the whole of that part and the sides will be raised up and almost inverted, while if the same be done with *L. marginatus* nothing of the kind takes place, indicating probably a more extended connection between the mantle and the body. In *Limax flavus*, which is so readily distinguishable from both *L. maximus* and *L. marginatus* in colour, the mantle is very loose too, and is likewise raised up when touched, but not to such a degree as in *L. maximus*.

A further communication from Dr. Scharff was read, in which he described a new method of killing mollusca in an extended condition. Having tried various methods of obtaining snails and slugs fully expanded for museum purposes he finds that the acetic acid process is fairly satisfactory if the solution is not too strong. The animals will at first contract pretty strongly and then relax again, when they should be carefully washed in water, then transferred to weak methylated spirit (about 30 per cent.) and afterwards to a 70 per cent. mixture, in which the animals should be preserved.

Exhibits :

Mr. William Nelson exhibited, on behalf of Mr. James Madison, of Birmingham, photographs of abnormal specimens of *Limnaea peregra*.

220th MEETING, WEDNESDAY, DECEMBER 6th, 1893.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., vice-president, in the chair.

Donation to Library announced and thanks voted : The Naturalist for December, 1893.

Paper Read :

A note by Mr. A. T. Daniel, M.A., on '*Hydrobia jenkinsi* in an Inland Locality' was read [and has been printed in the 'Journal of Conchology,' January, 1894, p. 325].

Exhibits :

On behalf of Mr. H. Wallis Kew, F.Z.S., was exhibited an example of *Limnaea auricularia* from High Beech, Epping Forest, to show the manner in which it had repaired its shell. A hole having been accidentally made in the middle of the superior aspect of the body whorl of its shell, the mollusc had repaired the damage by making what might be termed a 'dormer' mouth of the hole, and using it instead of the ordinary orifice.

Mr. Henry Crowther, F.R.M.S., exhibited type specimens from Cape Town of *Columbella kitchingi* Sowb., which had been presented by Mr. J. Langley Kitching, J.P., of Bewdley, to the Leeds Museum.

On behalf of Mr. F. W. Wotton were shown examples of *Helix itala* (= *erictorum*) and *H. caperata*, British species, from Wellington, New Zealand, where they are acclimatized. The former species was only introduced five or six years ago, with grass seeds. The specimens of *H. caperata* were from a virgin forest, where they are well distributed.

The Chairman exhibited a series of coloured drawings of distorted and labiate specimens of *Limnæa peregra*; also specimens of *Helix nemoralis* var. *pseudo-austriaca* Cless., from the Tyrol (Staudinger), *H. aspersa* var. *minor* Moq., from Llantwit Major, near Cardiff, *H. pomatia* var. *thessalica* Bgt., from Bulgaria, *H. nemoralis* var. *albolabiata* from Andorra, and var. *roscozonata* from Blagdon, near Bristol.

Candidate Proposed for Membership:

Mr. Ernest W. Williams (proposed by Mr. J. Burman Rosevear and Mr. James E. Cooper).

MANCHESTER BRANCH.

Meeting held at Owens College, December 9th, 1893.

Mr. Thos. Rogers in the chair.

Donation to Library:

By Prof. W. Boyd Dawkins: 'Catalogue of the Marine Mollusca of New Zealand,' for which thanks were voted to donor.

Paper Read:

By Captain W. J. Farrer: 'Notes on Collecting in the United States, and Habits of Certain North American Molluscs.'

Exhibits:

By Captain W. J. Farrer: A drawer of shells illustrative of his 'Notes,' including the denticulated Helices found in the States—*Helix sargentiana*, *Patula perspectivum* monst. *sinistrorsum*, *Limnæa gracilis*, and a number of species of *Physa*, *Succinea*, and *Unio*.

By Mr. C. H. Schill: *Helix arbustorum*, of gigantic dimensions, from Austria; and a singular form of *Limnæa*, remarkable for its solid structure and inflated lip, obtained by the amber dredgers in a large lake at Königsberg, in Northern Prussia.

By Mr. R. Cairns: *Helix nemoralis* and v. *minor* from Hawick, Scotland.

By Mr. C. Oldham: 86 locality sets of choice specimens, mounted in glass-topped boxes, of British land and freshwater shells, which he presented to the Cabinet. The thanks of the meeting were voted to him for his valuable and acceptable gift, which will form an important nucleus for the 'local' collection which is being formed by the Branch.

By Mr. Darbishire: 26 mounted sets of marine shells dredged by him in Mulroy Bay, co. Donegal, during August last, including *Panopea plicata*, *Axinus flexuosus*, *Lima hians*, and other good species. The entire collection was presented to the Cabinet by Mr. Darbishire, and the thanks of the meeting were tendered to him for his gift.—R. STANDEN, Hon. Sec.

221st MEETING, WEDNESDAY, JANUARY 3rd, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., vice-president, in the chair.

Donations to the Library announced and thanks voted : From the respective Editors : The current numbers of the *Naturalist*, the *British Naturalist*, and the *Feuille des Jeunes Naturalistes*.

From the respective Societies : Proceedings of the Davenport Academy, and of the Linnean Society of New South Wales, vol. 8, part 1.

From the Smithsonian Institution for their respective authors : A Sub-tropical Miocene Fauna in Arctic Siberia ; Report on Pteropods and Heteropods collected by the U. S. Fish Commission Steamer 'Albatross' in 1887-8 ; Molluscan Fauna of the Galapagos Islands ; Rare or Little-known Mollusca from the Western Coasts of North and South America ; Preliminary Report on Mollusca collected by the U. S. Scientific Expedition to West Africa in 1889-90.

New Member Elected :

Mr. Ernest W. Williams, Boof Street, Bridgetown, Barbados, B.W.I.

Candidates Proposed for Membership :

Mr. Edward Consterdine Stump (proposed by Messrs. R. Standen and Edward Collier) ; Mr. W. E. Scharff (by Messrs. J. W. Taylor, F.L.S., and W. Nelson) ; and Mr. John Hill (by Messrs. Thomas Hey and John W. Taylor, F.L.S.).

Paper Read :

A paper was read on behalf of Mr. R. Bullen Newton, F.G.S., of the British Museum (Natural History), entitled 'Note on some Molluscan Remains lately discovered in the English Keuper.' The paper was illustrated by diagrams and by the actual specimens from the collection of the Rev. P. B. Brodie [and will be published in a forthcoming number of the '*Journal of Conchology*'].

Exhibits :

On behalf of Mrs. Crowther were shown examples of *Helix lucorum* from the Asiatic side of the Bosphorus.

The Recorder showed an example of *Amalia carinata* collected at Middlesbrough by Mr. C. W. Baines.

222nd MEETING, WEDNESDAY, FEBRUARY 15th, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., vice-president, in the chair

Donations to the Library announced and thanks voted : From the respective Editors : The *Naturalist* and *Feuille des Jeunes Naturalistes* for February, 1894.

From the respective Societies : Bulletin de la Société d'Etudes Scientifiques de Paris—15e et 16e années—1892-93 (one part) ; and Transactions of Royal Society of South Australia, vol. 17, part 2, for 1892-93.

From the respective Authors : Ueber einige verkannte und neue Dori-
diden, von Dr. Rudolph Bergh, 1893 ; Die Gattung *Gastropteron*, von Dr.
R. Bergh, 1893 ; and Land Shells of the genus *Bulimulus* in Lower
California, with Descriptions of Several New Species, by W. H. Dall, 1893.

From the Leeds Corporation : Catalogue of Natural History Works in
the Reference Department of the Leeds Public Library, 8vo, 1893.

Donations to Cabinet Fund announced and thanks voted : From
Mr. Wm. Whitwell, F.L.S., Five Shillings.

New Members Elected :

Mr. Edward Consterdine Stump, 16, Herbert Street, Moss Side,
Manchester.

Mr. W. E. Scharff, Hill Crest, Ripon Road, Harrogate.

Mr. John Hill, Little Eaton, near Derby.

Decease of Members, etc. :

The decease of the veteran naturalist, Rev. George Gordon, LL.D., of
Braeburnie, Elgin, who died on the 12th of December last, in his 93rd year,
was announced and sorrow expressed at the loss of a member who had
during a long and useful life done so much good service for the natural
history of Moray.

The Chairman also called attention to the loss which conchology as a
science, particularly from its anatomical standpoint, had sustained in the
decease of Mr. Charles Ashford, of Christchurch, which took place suddenly
on the 31st January, at the age of 65. Although Mr. Ashford had never
been a member of the Society, he nevertheless took great interest in its
work, and was a frequent donor to its library and collections. Apart from
this his remarkably accurate knowledge of malacology and his unrivalled
excellence in dissecting and drawing entitle him to be had in remembrance
by any body of conchologists.

Papers Read :

A brief and interesting note on 'Mimicry in Mollusca,' embodied in a
letter addressed to the ex-president (Mr. Mason) by Mr. Edgar Leopold
Layard, C.M.G., F.Z.S., was read [and will shortly be printed in the
'Journal of Conchology'].

A short note by Mr. John W. Taylor, F.L.S., on the 'Occurrence of
a Sinistral Example of *Succinea oblonga* in South Perthshire' was read, and
the specimen exhibited [this note will shortly appear in the 'Journal of
Conchology'].

Exhibits :

On behalf of Mr. William Moss, F.C.A., of Ashton-under-Lyne, were
shown several fine examples of *Helix itala* (= *ericetorum*) var. *leucozona*
from Peel, Isle of Man ; also a number of photographs, viz., of the jaws of
Fissurella reticulata (Guernsey), *Glandina algira* (Europe), and *Gibbula*
cineraria (Looe), and of the shells of *Cylindrella trinitaria* and an un-
identified *Bulimulus*, both from Trinidad.

On behalf of Mr. A. G. Stubbs, of Nottingham, were shown living examples of *Helix obvoluta* from Sussex.

The Chairman showed examples of *Physa acuta* from Banner Mill, near Aberdeen, and from the Botanical Gardens, Regent's Park, London.

He also exhibited *Helix cantiana* var. *minor* from Yardley Hastings, Northamptonshire, where they were collected in August, 1886, by Mr. R. Rogers.

Also *Paludina conlecta*, from Southport, sent by Mr. G. W. Chaster; and *Planorbis corneus* in its extreme variations of size; var. *major* from Krapinova, Slavonia, and var. *minor* from Newsholme, Yorkshire.

On behalf of Mr. H. Wallis Kew, F.Z.S., was shown an example of *Limnæa glutinosa* from Saltfleetby All Saints, a new record for the county of Lincoln.

The Recorder exhibited a number of shells collected in Banffshire by Mr. Lionel W. Hinxman, of the Geological Survey of Scotland, during the summer of 1893, the locality being Inchroty in Glenavon, at an altitude of 1,400—1,600 feet above sea-level, including *Limnæa auricularia* var. *acuta* and *Ancylus fluviatilis* and its var. *albida*, which are new records for that county.

He also showed a number of shells collected in Stirlingshire by Mr. Andrew McLellan, including the following, which are new records for that county: *Vertigo pygmaea*, *Dreissensia polymorpha*, *Limnæa palustris*, *Planorbis parvus*, *Succinea elegans*, *Hyalinia radiatula*, *H. fulva*, *H. pura*, *H. allizria*, *Anodonta cygnea*, *Unio margaritifera*, *Physa fontinalis*, *Bullinus hypnorum*, *Bythinia tentaculata*, *Carychium minimum*, *Helix pulchella*, *H. aspersa*, and *H. aculeata*.

The Recorder further showed a considerable number of shells embodying new records for Scottish counties which had been sent by Mr. Wm. Evans, F.R.G.E. The new records among these were *Hyalinia radiatula* for Haddingtonshire (from Luffness Links), *Planorbis spirorbis* for Linlithgowshire (from Drumshoreland), *Helix aculeata*, *H. arbustorum*, and *H. hispida* for South Perthshire (all three from Bridge of Allan), and *Buliminus obscurus* (Aberdour) and *Planorbis parvus* (Kilconquhar Loch) for Fifeshire.

W. D. R.



Succinea oblonga m. sinistrorsum.—Shell sinistral. This form which is, I believe, new to science, was picked out by me from amongst a few of the typical form kindly given by Mr. McLellan. The specimens were found in an old road-side quarry in South Perthshire during the autumn of 1893 by a conchological friend of Mr. McLellan's.—JOHN W. TAYLOR, February, 1893.

MARINE SHELLS OF SOUTH AFRICA.

BY G. B. SOWERBY, F.L.S., F.Z.S.

(Read before the Conchological Society, November 3rd, 1893).

THE following species have been brought to my notice since the publication of my work with the above title in 1892.

The references are not always to original descriptions, but to figures in well-known works.

Murex ramosus Linn.—Sow., 'Thes. Conch.,' vol. iv., pl. 387, fig. 69. Natal.

Tritonidea subrubiginosa.—Smith, 'Proc. Zool. Soc.,' 1879, p. 200, pl. 20, fig. 40. Natal (Burnup).

Pleurotoma cingulifera Lamk.—Reeve, 'Conch. Icon.,' vol. i., *Pleurotoma*, fig. 1. A young shell from Knysna.

Mangilia cerea (?) Carpenter.—A small shell bearing a very close resemblance to this species has been submitted to me by Mr. Langley Kitching, from near Cape Town.

Triton gemmatus.—Reeve, 'Conch. Icon.,' vol. ii., *Triton*, pl. 15, fig. 60. Natal.

Triton tuberosus Lamk.—Reeve, 'Conch. Icon.,' vol. ii., *Triton*, pl. 1, fig. 1. Natal.

Triton gallinago.—Reeve, 'Conch. Icon.,' vol. ii., *Triton*, pl. 2, fig. 3. Natal.

Triton monilifer.—Adams & Reeve, 'Voyage, Samarang,' pl. 10, fig. 18. Natal.

Triton (Persona) anus Lamk.—Reeve, 'Conch. Icon.,' vol. ii., *Triton*, pl. 12, fig. 44. Natal.

Nassa algida.—Reeve, 'Conch. Icon.,' vol. viii., *Nassa*, pl. 22, fig. 145. Natal.

Bullia pustulosa Sowerby, n. sp.

Testa acuminata, solidiuscula, luteo-albida; spira acute turrata, ad apicem obtusiuscula; anfractus 6 primi (2) leves, sequentes granulati, spiraliter sulcati, longitudinaliter plicati, sutura

anguste canaliculata divisi; anfractus ultimus spiram paulo superans, leviter inflatus; apertura latiuscula; columella leviter incurva, callosa.

Long. 19, diam. maj. 9 millim.

Hab. Natal, Durban.

A very distinct species which may be at once recognized by its granular sculpture.

Oliva ispidula Linn.—Sowb., 'Thes. Conch.,' vol. iv., p. 21, pl. 343, fig. 248.

Fasciolaria trapezium Linn.—Sowb., 'Thes. Conch.,' vol. v., pl. 426, fig. 22. Natal.

Latirus abnormis Sowerby, n. sp.

Testa elongato-fusiformis, crassa, utrinque acuminata, umbilicata, castanea; spira turrita, acuta, sutura irregularis; anfractus 6-7, leviter convexi, nodis conspicuis rotundatis armati; spiraliter sub-obsolete lirati; anfractus ultimus superne leviter concavus, obtuse bi-angulatus, ad angulum superum valde nodosus, ad angulum inferum nodis lævigatis munitus, inferne leviter concavus, in cauda breviuscula desinens; apertura oblonga; columella rectiuscula, albo-callosa, glabra, haud plicata; canalis latiusculus, mediocriter longus.

Long. 57, diam. maj. 23 millim.

Hab. Natal.

This species, though evidently a *Latirus*, shows no signs of the columellar folds supposed to be characteristic of that genus. In this respect, however, it does not stand alone, the same being observed with regard to *L. gibbulus* Gmel., and the species from the Cape de Verde Islands, to which I recently gave the name of *L. maximus* ('The Conchologist,' 1893, vol. ii., p. 139, pl. 1, fig. 5).

Voluta festiva Lamk.—Sowb., 'Thes. Conch.,' vol. i., pl. 52, figs. 79, 80. A young specimen of this rare species was recently found on the Natal coast by Mrs. Trotter.

Mitra literata Lamk.—Sowb., 'Thes. Conch.,' vol. iv., pl. 372, fig. 436. Natal.

Mitra limbifera Lamk.—Sowb., 'Thes. Conch.,' vol. iv., pl. 366, fig. 261. Natal.

Marginella rufula Gaskoin (MSS.).—Reeve, 'Conch. Icon.,' sp. 149. Green Point, Cape of Good Hope.

Marginella perminima Sowerby, n. sp.

Testa minuta, oblongo-ovalis, albida, postice rotundata, antice leviter attenuata; spira immersa; apertura angusta; columella triplicata; labrum crassiusculum.

Long. $1\frac{1}{2}$, *lat.* $\frac{3}{4}$ millim.

Hab. South Africa (Captain Turton).

A minute species with immersed spire, allied to *M. minima* Guelding, but more cylindrical in form.

Columbella kitchingi Sowerby, n. sp.

Testa breviuscula, crassa, imperforata, albida, fusco-bifasciata; spira acutiuscula; anfractus 5, convexi, sutura anguste canaliculata sejuncti, longitudinaliter costati, costis circ. 8, rotundatis; anfractus ultimus leviter inflatus, infra medium contractus; apertura auriformis; labrum arcuatum, intus valde quadriplicatum; columella rectiuscula, laevis.

Long. 6, *maj. diam.* 3 millim.

Hab. Green Point, Cape of Good Hope.

This species somewhat resembles *C. cerealis*, but it has plain-brown bands in place of the zig-zag markings, and is notably distinguished by the dentiform plicæ in the mouth. The type-specimen was found in the above locality by Mr. Langley Kitching, after whom I have pleasure in naming it. There are also specimens in the British Museum.

Columbella (Mitrella) pyramidalis Sowerby, n. sp.

Testa angusta, crassiuscula, laevis, lutea, fusco sparsim strigata; spira elongata, acuta; anfractus 8, plani, laevis, sutura linearis; anfractus ultimus infra medium obtuse angulatus; apertura latiuscula, utrinque attenuata; columella incurva, truncata; canalis brevissimus.

Long. 11, *diam. maj.* 3 millim.

Hab. Port Elizabeth.

A smooth shell with a very long spire.

Cassis glauca Linn.—Reeve, 'Conch. Icon.,' vol. v., *Cassis*, pl. 12, fig. 33. Natal.

Pyrula ficus Linn.—Sowb., 'Thes. Conch.,' vol. iv., pl. 423, fig. 4 (as *Ficula* f.). Natal.

Natica quekettii Sowerby, n. sp.

Testa globosa, mediocriter umbilicata, crassiuscula, undique fusco multipunctata, maculis grandibus fuscis irregulariter picta; spira brevissima, anfractus 4, lævis, convexi, sutura profundiuscula sejuncti; anfractus ultimus inflatus, rotundatus; umbilicus profundus sub-circularis, saturate fusco marginatus; apertura semi-circularis; columella obliqua, vix curvata.

Long. 7, maj. diam. 8 millim.

Hab. Natal.

A small species somewhat resembling *N. imperforata*, but distinctly perforate. It differs in form from *N. forata*, and the umbilicus is smaller.

Natica sebæ.—Souleyet, 'Voyage de la Bonite,' pl. 35, figs. 6, 7; 'Thes. Conch.,' vol. v., pl. 457, fig. 79. Natal.

Natica tæniata Menke = **N. ala-papilionis** Chemn.—Sow., 'Thes. Conch.,' vol. v., pl. 457, pl. 46. Natal.

Scalaria simplex Sowerby, n. sp.

Testa elongato-pyramidata, imperforata, alba, nitida; anfractus 6, rotundati, sutura profunda sejuncti; costis leviter obliquis 9-10, æqualibus, crassiusculis, simplicibus, vix angulatis; apertura fere circularis, peristoma crassiusculo.

Long. 8, maj. diam. 4.5 millim.

Hab. Natal.

A small *Scalaria* with no prominent distinguishing characters, but seemingly different from any hitherto described.

Aclis unilineata Sowerby, n. sp.

Testa elongata, angusta, tenuis, alba; spira turrata; anfractus 8, planato-convexi, longitudinaliter minutissime densissime plicati, linea unica fusca spiraliter cincti; sutura impressa, lira angusta insecta; anfractus ultimus breviusculus vix inflatus, ad basin rotundatus, lævissime productus; apertura ovata; columella tenuissima, leviter incurvata, haud plicata, peristoma simplex.

Long. 5, maj. diam. 1½ millim.

Hab. Port Elizabeth.

A narrow little white shell with a brown spiral line about the middle of the whorls. From the form of the mouth and columella it appears to be an *Aclis*, though in sculpture it is more like a *Turbonilla*.

Solarium perspectivum Linn.—Sowb., 'Thes. Conch.,' vol. iii., pl. 253, fig. 36. Natal. A small specimen.

Solarium (Philippia) hybridum Linn.—'Thes. Conch.,' vol. iii., pl. 253, fig. 42. St. John's (Captain Turton).

Solarium dorsuosum Hinds.—Sowb., 'Thes. Conch.,' vol. iii., pl. 254, figs. 73–74. Natal. St. John's (Captain Turton). This species is found in the Persian Gulf and in Japan.

Cerithium crassilabrum Krauss.—Sud., 'Afr. Moll.,' pl. vi., fig. 10. Natal.

Pyrasus palustris Brug.—Sowb., 'Thes. Conch.,' vol. ii., pl. 185, fig. 261. Natal.

Turbo (Pachypoma) taylorianus Smith, Proc. Zool. Soc., 1880, pl. 48, fig. 9, p. 483. Port Elizabeth.

Turbo (Collonia) pillula Dunker.—Sowb., 'Thes. Conch.,' vol. v., pl. 505, fig. 160. St. John's (Captain Turton).

Gibbula fucata Gould, 'Proc. Bost. Soc. N. H.,' p. 8, p. 20. Simon's Bay (Captain Turton). A prettily-marked rather compressed variety was found by Mr. Langley Kitching, at Green Point, near Cape Town.

Gibbula incincta Sowerby, n. sp.

Testa conica, obtusiuscula, umbilicata, aurantio-fusca, et viridescente, fasciis angustis albidis, maculis angulatis fuscis articulatis picta; anfractus 5 convexo declives, fere læves, oblique sub-obsolete sulcati, lira rotundata marginati; basis leviter convexa, oblique plicata, spiraliter subtilissime striata; umbilicus late et profunde excavatus, albus, carina obtusiuscula marginatus; apertura oblique sub-quadrata; columella tenuis, obliqua, levissime reflexa; peristoma simplex.

Alt. 6, maj. lat. 6 millim.

Hab. Port Elizabeth.

A simple conical shell with an obtusely-keeled margin. It somewhat resembles *G. capensis*, but is much more elevately conical.

Clanculus kraussi Philippi, 'Conch. Cab.,' p. 82, pl. 14, fig. 14. Natal.

Fissurella mutabilis Sowb. var. **sagillata** Reeve.—Sowb., 'Thes. Conch.,' vol. iii., pl. 239, fig. 83.

Fissurella similis Sowb., 'Thes. Conch.,' vol. iii., pl. 241, fig. 143, p. 143. Durban (Captain Turton).

Macrochisma compressa A. Adams. — Sowerby, 'Thes. Conch.,' vol. iii., pl. 244, fig. 218. Captain Turton.

Chiton lyratus Sowb., 'Conch. Illust.,' fig. 15. Port Elizabeth.

Cylindrobulla sculpta G. & H. Neville, 'Journ. Asiatic Soc.,' Pt. 2, No. 2, 1869, p. 68, pl. 13, fig. 3.

Volvatella laguncula Sowb., n. sp.

Testa ovato-cylindracea, membranacea, involuta, postice abrupte contracta, breviter producta, antice rotundata; apertura antice late ovata, postice sinuosa, angustissima, labro dextro utrinque desinente, in medio inflexo, sinistro leviter reflexo.

Long. 6, diam. $3\frac{1}{2}$ millim.

Hab. Port Elizabeth.

Unfortunately I have only the shell of this species, so that it is impossible with certainty to establish its generic position; the form of the shell, however, leaves little room for doubt that it is a true *Volvatella*. Compared with *V. cumingii* it is much smaller, less abruptly truncated and produced posteriorly, and proportionately wider anteriorly; it is also less cylindrical in form than *V. cincta* of Neville, and shows no sign of the transverse bands characteristic of that species.

PELECYPODA.

Basterotia obtusa Sowb., n. sp.

Testa æquivalvis, inæquilateralis, quadrato-subovata, leviter inflata, antice abbreviata, rotunde truncata, postice obtuse angulata, oblique producta, sordida, concentrice dense striata. Umbones approximati, leviter prominentes. Cardo in utraque valva dentem unicum valde productum, leviter excurvatum, postice lamina abbrevitata crassiuscula angulato-elevata munitus. Impressiones musculares vix perspicua.

Antero-post. 12, umbono-marg. 8 millim.

Hab. Durban.

The genus *Basterotia* Mayer in Hörnes ('Die Fossilen Mollusken des Tertiär-Beckens von Wein,' vol. iv., p. 40, pl. 3, fig. 11 a-g, 1859) was founded on a fossil species *B. corbuloides* Mayer. The recent type is *Corbula quadrata* Hinds ('Proc. Zool. Soc.,' 1843), for which Recluz proposed the generic name of *Eucharis* ('Journal de Conchyliologie,' vol. i., p. 168, 1850); name pre-occupied by Latreille in 1804. The new species *Basterotia obtusa* resembles *B. corbuloides* in form, but instead of a keel from the apex to the posterior margin, it has only a very obtuse rounded angle.

Pandora dissimilis Sowb., n. sp.

Testa fere æquivalvis, inæquilateralis, oblonga compressa, postice latior, antice angustior, utrinque obtuse subangulata; extus sordida, concentrice irregulariter rugata. Margo dorsalis acutus; anticus curtus leviter declivis; posticus longus rectiusculus; lunula nulla. Margo ventralis leviter flexuosus. Valvis utrinque leviter hiantis. Umbones acuti. Cardo lira longa crassiuscula, oblique descendens, ligamentum ferente; in valva dextra dente unicus elevatus claviformis instructus. Pagina interna margaritacea iridescens; impressiones musculares duæ subcirculares.

Antero-post. 45, umbono-marg. 25 millim.

Hab. Sea Point, Cape Town.

After some hesitation I have decided to place this remarkable species in the genus *Pandora*. It differs very

much from the typical forms, and chiefly in the equality of the valves. The hinge, however, is that of a *Pandora*, although the club-shaped tooth is much more prominent than in any other species with which I am acquainted. The oblique ridge holding the ligament is similar to that of *P. claviculata* Carpenter.

Raeta pellicula Deshayes.—Reeve, 'Conch. Icon.,' *Maetra*, pl. 21, fig. 124. A single valve from Durban.

Semele cordiformis Chemnitz. — Reeve, 'Conch. Icon.,' *Amphidesma*, pl. 5, fig. 30. Natal.

Psammobia burnupi Sowb., n. sp.

Testa oblonga, æquivalis, inæquilateralis, planulata, antice rotundata, postice truncata, ubique concentricè striata, luteo-fusco tincta, fasciis fuscis irregulariter notata, lineis fuscis minutis divergentibus veniformibus picta; umbones acuti, haud prominentes; margo dorsalis anticus longus, leviter curvatus; anticus curtus leviter declivis, obtuse angulatus; margo ventralis rectiusculus anticus rotundatus, posticus obtuse angulatus; ligamentum externum, mediocriter longum; cardo normalis; pagina interna saturate purpurea.

Antero-post. 28, umbono-marg. 14 millim.

Hab. Natal (Burnup).

Var. β—sordide lutea, obscure radiata; pagina interna albida pallide luteo-fusco tincta.

Tellina dispar Conrad.—Sowb., 'Thes. Conch.,' vol. i., p. 306, pl. 59, fig. 108. Natal.

Tellina virgata Linn.—Sowb., 'Thes. Conch.,' vol. i., p. 228, pl. 63, fig. 212. Natal.

Tellina rastellum Hanley.—Sowb., 'Thes. Conch.,' vol. i., p. 225, pl. 64, fig. 231. Natal.

Tellina (Macoma) candida Sowb., n. sp.

Testa sub-oblique ovalis, æquivalvis, inæquilateralis, leviter inflata, alba, glabra, nitens. Umbones acutiusculi, leviter prominentes, conjuncti. Margo dorsalis utrinque declivis; anticus longiusculus; posticus brevior, majis declivis. Margo ventralis leviter arcuatus. Latus anticum rotundatum; posticum obtuse biangulatum.

Antero-post. 16, *umbono-marg.* 12 millim.

Hab. Durban.

A very simple white shell.

Strigillia trotteriana Sowerby, n. sp.

Testa rotunde subovata, solidiuscula, æquivalvis, subæquilateralis, convexiuscula, nitida, alba, luteo tincta, prope umbones lutea, varie et conspicue striata; striis anticis concentricis sub-remotis; medianis obliquis subradiantibus, cum striis anticis angulum deflectum formantibus; posticis sub-concentricis, creberrimis, leviter undulatis. Margo dorsalis utrinque declivis; anticus brevis, rotundatus, leviter flexuosus; posticus longior, rectiusculus. Cardo normalis. Pagina interna lutea.

Antero-post. 12, *umbono-marg.* 10 millim.

The striæ are not so close as in *S. carnaria*; those on the anterior side (nearly half the valve) are nearly concentric, and form an angle with the oblique striæ which cover the middle portion to the posterior angle, behind which they are again concentric and much closer. This very interesting species was found at Durban by Mrs. Trotter.

Donax nitidus Deshayes.—Sowb., 'Thes. Conch.,' vol. iii., p. 314, pl. 282, fig. 75. Natal (Burnup). The specimens of this species in the British Museum are from E. Australia.

Donax lubricus Hanley.—Reeve, 'Conch. Icon.,' *Donax*, pl. 7, fig. 46.

Donax æmulus Smith, 'Proc. Zool. Soc.,' 1877, p. 271, pl. 75, figs. 23–25. Durban (Captain Turton).

Mactra æquisulcata Sowb., n. sp.

Testa sub-trigona, æquivalvis, fere æquilateralis, solidiuscula, leviter inflata, pallide lutescente-cornea, utrinque concentricæ dense sulcata; umbones obtusiusculi, incurvati, purpureo tincti; margo dorsalis utrinque declivis, area latiuscula, planato-convexa, lunula vix conspicua; margo ventralis arcuatus; cardo normalis; pagina interna polita, albida, pallide purpureo-griseo fasciatim tincta.

Antero-post. 58, *umbono-marg.* 48 millim.

Hab. Natal (Burnup).

I know of no species bearing a very close comparison with this. It is of much the same texture as *M. semisulcata* Desh., but higher and much more nearly æquilateral; it is, moreover, equally sulcated at both ends, the sulci, excepting near the umbones, crossing the valves.

Donax burnupi Sowb., n. sp.

Testa elongata, angusta, leviter flexuosa, pallide fulva, obscure fusco radiata, polita; area postica sulcata, sulcis numerosis profundis oblique sub-verticalis. Margo dorsalis anticus longus, rectiusculus, leviter declivis, posticus brevis, rotundatus. Cardo normalis. Pagina interna albida, utrinque violaceo tincta.

Antero-post. 26, umbono-marg. 12 millim.

Hab. Natal (Burnup).

At first sight this shell resembles the European *D. politus*, but it is distinguished by the remarkable posterior sulci.

Cytherea (Caryatis) manillæ Sowb., 'Thes. Conch.,' vol. ii., p. 634, pl. 136, figs. 180-181. Natal (a single valve).

Cytherea (Meretrix) zonaria Lamarck.—Sowb., 'Thes. Conch.,' vol. ii., p. 620, pl. 129, figs. 53-54. Natal.

Circe (Crista) divaricata Chem.—Sowb., 'Thes. Conch.,' vol. ii., p. 250, pl. 137, figs. 8-9. Natal.

Meroë contempta Smith, 'Proc. Zool. Soc.' Natal.

Cardium tenuicostatum Lamarck.—Reeve, 'Conch. Icon.,' *Cardium*, pl. 10, fig. 50. Natal.

Cardium rugosum Lamarck.—Reeve, 'Conch. Icon.,' *Cardium*, pl. 14, fig. 68. Natal.

Cardium rubicundum Reeve, 'Conch. Icon.,' *Cardium*, pl. 9, fig. 44. Natal.

Cardium papyraceum Chemnitz.—Reeve, 'Conch. Icon.,' *Cardium*, pl. 2, fig. 9. Natal. A specimen in excellent condition, with epidermis in raised ridges on the ribs.

Cardium turtoni Sowb., n. sp.

Testa sub-oblique orbiculata, æquivalvis, inæquilateralis, solidiuscula, parum inflata, albida, maculis fuscis diversiformibus

picta, radiatim costata ; costis 26, planulatis, rotunde conspicue nodulosis ; interstitiis angustis, transversim sulcatis ; umbones prominentes ; pagina interna alba, utrinque fusco tincta.

Antero-post. 12, *umbo-marg.* 12.

Hab. Port Elizabeth.

This species is quoted by me—'Marine Shells of South Africa,' p. 61—as *C. fasciatum* from worn valves found at Port Elizabeth. Having now seen shells in better preservation (though still only odd valves) I am convinced of my error. The nodules are easily worn off, leaving the ribs smooth.

Chama iostoma Conrad.—Reeve, 'Conch. Icon.,' *Chama*, pl. 2, fig. 7. Natal.

Lucina (Codakia) pecten Lamarck.—Reeve, 'Conch. Icon.,' vol. vi., *Lucina*, sp. 38. St. John's, Durban.

Lucina (Divaricella) quadrisulcata D'Orbigny = **Lucina eburnea** Reeve, 'Conch. Icon.,' vol. vi., *Lucina*, pl. 8, sp. 49. Natal. There are specimens in the British Museum from St. Helena. I have the same species from Hong-Kong.

Loripes clausus Philippi, 'Abbilæ und Beschr. Conch.,' vol. iii., *Lucina*, pl. 2, fig. 2. Natal. This is the shell quoted by me in 'Marine Shells of South Africa,' p. 61, as *Loripes lacteus*. There are specimens in the British Museum from Mozambique.

Pinna saccata Linn.—Reeve, 'Conch. Icon.,' *Pinna*, pl. 4, fig. 6. Natal.

Anomia ephippium Linn.—Sowb., 'Illust. Index of British Shells,' pl. 9, fig. 18. Natal.



ADDITIONS TO 'BRITISH CONCHOLOGY.'
ADDENDA.

By J. T. MARSHALL.

(Read before the Conchological Society, April 4th, 1894).

The following should be added to my paper under the above title, which appeared in the 'Journal of Conchology' for October, 1893 :—

Terebratula septata Phil. Dr. Jeffreys, in 'B. C.' vol. ii., p. 14, writing on *T. cranium*, says that the young 'are furnished with a very distinct and prominent crest or ridge, placed inside and nearly in the middle of the lower valve. . . . This character also occurs in *T. septata* Phil., and is remarkably developed in that species; but the foramen is incomplete in *T. cranium* and entire in *T. septata*.' [These remarks apply *not* to the young of *T. cranium* but to that of *T. septata*, and both were dredged together in Shetland. It was not figured nor noticed by Jeffreys in his work, but full particulars and figures will be found in the 'Lightning' Report, and it is well figured in Sowerby's Index].

In the 'Porcupine' cruise of 1869 about thirty specimens of this fine brachiopod were obtained alive in one haul of the dredge, besides numerous fragments, in 345 fathoms in the Shetland Channel. Single specimens and other fragments were also obtained at different depths in the same cruise.

Leda pernula Müll. I think this species has sufficient claim to be admitted into the British List. Dr. Jeffreys dredged a small live specimen and a valve off the Shetlands, but hesitated to introduce it as British until he had obtained a full-grown specimen. Although he did not succeed in this, perfect dead shells and some valves have been taken in Loch Duich, Ross-shire, and St. Magnus Bay, Shetland ('B. C.' App., pp. 173—4); Eigg Island, near Skye, 20

fathoms; west coast of Ireland, 251 fathoms; and Loch Torridon, 40 fathoms ('Porcupine' cruise).

Neæra rostrata Spengler. This was described and figured by Jeffreys in their proper places in 'British Conchology,' but omitted from Mr. Somerville's list, as it was introduced into the British fauna on the very slightest grounds—'a right valve only.' But Dr. Jeffreys afterwards dredged it off the west of Ireland and off the Butt of Lewis, and it may be well to retain it, at least tentatively, as a British species.

Cassidaria echinophora L. (See 'J. of C.' for October, 1893.) The specimen in the British Museum was inadvertently labelled *C. echinophora*, but has now been corrected to *C. tyrrhena* Lam., and the date of its discovery should be 1890, and not 1886, as stated in my paper. Specimens of *C. tyrrhena* were, however, taken in 1886, as well as on several other occasions, off the coast of Ireland, and Professor Haddon has given the following records in the Proceedings of the Royal Irish Association (I., pp. 40—42):—(1) Off Valentia Island, Kerry, 40 fathoms, a dead specimen taken in the trawl, 1880; (2) off the south-west of Ireland, 265 fathoms, two live specimens dredged in a cruise organised by the Royal Irish Academy, 1886. I am indebted to Mr. A. R. Nichols, of Dublin, for the following further records:—(3) Off the south-west of Ireland, 345 fathoms, a live specimen procured in another cruise of the Royal Irish Academy in 1888; (4) off the same part of the coast, 400 fathoms, two specimens dredged by H.M.S. 'Research,' in 1889. In addition to the above, fragments were dredged in the 'Porcupine' cruise of 1870 off Ireland, in 539 fathoms, in lat. 48° 6' N., long. 9° 18' W.

The particular specimen in the British Museum was taken with another in a fishing expedition organised by

the Royal Dublin Society in 1890, forty miles off Achil Head, Mayo, in 220 fathoms.

Perhaps *C. echinophora* may yet be added to the British List, as fragments were obtained in the 'Porcupine' cruise of 1869, in lat. $54^{\circ} 15'$ N. long. $11^{\circ} 9'$ W.

The Museum specimen also appeared under the generic title of *Morio* Montfort (1810), following Fischer, it being taken for granted that the latter had sufficient reasons for adopting that name, as it has priority over *Cassidaria* Lam. (1812); but 'Latreille used that name in the same year, and as I believe with acceptance, for a group of coleoptera' (Watson, 'Chal.' Rep.). As a matter of fact, *Morio* is now in use among coleopterists, and is therefore out of court for conchological purposes.

Odostomia interstincta var. **moulinsiana** = *O. (Pyrgulina) moulinsiana* Fischer. Described and figured in the 'Journal de Conchyliologie,' 1865, p. 215, pl. vi., fig. 9. I know this variety from Torbay only, where it is occasionally dredged. It is a well-marked variety, but hardly a distinct species, and differs from the type chiefly in being longer and more slender, with coarser sculpture and a prominent tooth. It differs equally as much from the var. *terebellum*, being less than half the size, narrower and more tapering, with proportionately stronger sculpture. My specimens have been compared with Dr. Fischer's types from Arcachon, and they are identical. Dr. Jeffreys could not have given sufficient examination or consideration to this form, or I feel sure he would not have united it with the var. *terebellum*, from which it differs in size, shape, and sculpture.

E. philippii var. **tumidosa** Marsh. (See 'J. of C.' for October, 1890, and for October, 1893). I have submitted specimens of this puzzling species to the Marquis de Monterosato, and he pronounces them to be 'distinctively'

E. curva (Jeff. MS.) Monts., and it was described by him in the 'Journal de Conchyliologie,' 1874, XIV., p. 269. The species had altogether escaped me in consequence of Jeffreys not mentioning it in any of his works. A paper on the *Eulimidae* of the 'Lightning' expedition, published just before his death, does not notice it in any way. Besides the localities Land's End and Scilly given in my paper, I have dredged it also off Guernsey, in 22 fathoms. These latter are very much smaller than those from Scilly, showing a great variation in size peculiar to all the *Eulimidae*. (See also a note by Mr. Sykes in the 'Conchologist' for June, 1893).

Odostomia pusilla Philippi. Dr. Jeffreys has confounded two species under this name. He originally described it ⁽¹⁾ as having 'the ribs always curved, but not set obliquely,' whereas Philippi's shell was described as having the ribs oblique. Jeffreys afterwards wrote—⁽²⁾ 'On further consideration I must hesitate in considering this species that of Philippi. The size given by him is much smaller, the ribs are set obliquely, and he noticed spiral striæ, which this species does not possess. Judging from the excellent figure of *Turbonilla gradata* Monts., which represents a variety of this, I am inclined to adopt the latter name.' Yet, although 'inclined to adopt' *O. gradata* for our shell, he refrains from doing so, and adheres to *O. pusilla* in the 'Lightning' Report. But, as will be seen below, *O. gradata* is inadmissible for our shell.

The Marquis de Monterosato, whose opinions are entitled to the greatest weight, holds that the shell described by Jeffreys is not the *O. pusilla* of Philippi, and he has re-named our shell *O. innovata* ⁽³⁾; but what he calls *O. pusilla* is also British, and not uncommon on some parts of our coasts.

(1) British Conchology, vol. iv., p. 168.

(2) Annals, May, 1884, p. 358.

(3) Nomenclatura, 1884, p. 92.

The above changes do not, however, put matters quite straight, for Philippi described his shell as 'much smaller' and as 'having spiral striæ,' while Monterosato calls our shell '*più grande*.' As regards size, however, Mediterranean specimens are much smaller than British ones, both species attaining on our coast $2\frac{1}{4}$ lines in length; but the question of 'spiral striæ' is rather puzzling. I should have attributed this to *O. terebellum*, but that that is also one of Philippi's species. Or Philippi may have had *O. terebellum* and *O. pusillum* mixed, as I have had myself from Continental collectors; they are certainly very much alike. But, at any rate, Philippi's 'spiral striæ' is not present in any British form in this section.

The true *O. pusilla* is intermediate between *O. lactea* and *O. innovata*. While *O. lactea* is a lengthened cone, *O. pusilla* is subcylindric, and *O. innovata* tubular. In *O. lactea* the ribs are curved, in *O. pusilla* they are oblique, and in *O. innovata* they are flexuous, especially on the lower whorls. The characters of *O. innovata* are well defined in 'British Conchology,' while *O. pusilla* differs from it in being thinner, the sculpture is finer and closer, the spire is gracefully proportioned, and there is no trace of a tooth. Both forms have their peculiar variations, and they are especially variable in size.

The localities given by Jeffreys in 'British Conchology' must not now be relied upon, as he included both species; but I think it will generally be found that, except from Guernsey, nearly all the shells under this name in British collections are *O. pusilla* Phil. (non Jeff.). I append below the localities that I can vouch for myself.

- O. pusilla** Phil. (non Jeff.). The sculpture varies in the degree of obliquity, being occasionally nearly straight, but it is never curved as in *O. lactea*, nor flexuous as in *O. innovata*. It attains the same length as the latter in Britain, but is

more gracefully proportioned, and the spire never terminates abruptly as in that species, and is probably widely diffused on our coasts, and not uncommon in Jersey and Torbay. At present I am sure only of the following localities for it :—St. Aubin's Bay, Jersey ; Guernsey ; Borough Island, Torbay, and Exmouth, South Devon ; Portmarnock. L. 0·35. B. 0·06. Most of the shells under this name in British collections will be found to belong to this form.

Var. **grossa** Monts. MS. This is less cylindrical than the type, and broader throughout, with coarser sculpture. It has somewhat the proportions of *O. lactea*, for which it may easily be taken, but it is never conical like that shell, the lower whorls being of the same width, and rounder at the base. I know of only three localities for this variety, all northern—Stornoway, 10 fathoms ; Loch Inver, 25 fathoms ; and Gairloch, 12—30 fathoms. In the latter district it is fairly plentiful. L. 0·35. B. 0·08.

Var. **cylindrata** Marshall. Already described by me ⁽¹⁾ and recorded from various localities. This is very slender and cylindrical, the base somewhat contracting, and it resembles a large and coarse *O. delicata*. L. 0·30. B. 0·04. Not *Eulimella cylindrata* Dunker.

Var. **minuscula** Marshall. Also previously described ⁽²⁾ and recorded from Jersey, North Wales, &c.

O. innovata Monts. (emend.). This is the form described by Jeffreys as *O. pusilla* in 'British Conchology.' It is a scarce shell, and I have not found it in any number except at Guernsey. The following localities may be relied upon :—Jersey, Guernsey, and Herm ; Scilly, 40 fathoms ; Borough Island and Torbay, South Devon. The ribs on the last whorl are not continued so far down as in *O. pusilla* and *O. lactea*, nor do they end so abruptly. The sculpture is exactly that of *O. sigmoidea* Monts., oblique on

(1) 'Journal of Conchology,' October, 1893.

(2) 'Journal of Conchology,' April, 1891.



JAN. 7, 1829.

JAN. 31, 1894.



Yours truly,
Chas. H. Ford

Christchurch, Hants
30 Jan 1894 Even^g

the first whorls, then gradually becoming flexuous, and the tooth is often visible. Jeffrey's figure is a fair outline of the shell, but it is wretchedly executed, and the dimensions (3 lines) are too long. His largest specimens came from me, and were $2\frac{1}{2}$ lines long, but the usual size is 2 lines. Sowerby's figure does not correctly represent any British shell. It is conical in shape, has straight ribs, compressed whorls, and a narrow suture, unlike any of the foregoing, and the length given is a line and a quarter.

Var. **nana** Marshall. This form was included in my description of *O. pusilla* var. *minuscule*, but must now be separated. The two dwarfs are as distinct as the types. L. 0.01. B. 0.03. I can record this from Guernsey only, in 20 fathoms. Specimens from Algiers, however, labelled *Turbonilla semicostata* de Folin (non *O. semicostata* Jeff.) are without doubt the same as this.

Var. **gradata** Monts. ⁽¹⁾ Without entering on the question whether this is a good species, it certainly is distinct from any of the foregoing. All its characteristics are those of *O. innovata*, but that the whorls are turreted or scalariform as in *O. scalaris*, though not to the same extent. But while *O. scalaris* is a conical shell, this is cylindrical, as the whorls shelve downwards towards the suture. We have nothing like this form in Britain.

The East Shetland record of *Arca nodulosa* Müll., given in my paper, is open to doubt, and must not therefore be relied upon.

SEVENOAKS, TORQUAY,
February, 1894.

(1) Enum. e Sin, 1878, p. 33.

MIMICRY IN MOLLUSCA.

BY EDGAR LEOPOLD LAYARD, C.M.G., F.Z.S., ETC.

(Read before the Conchological Society, February 15th, 1894).

I read with much interest the Presidential address by Mr. P. B. Mason, and while doing so, one or two little things occurred to me that I think are of interest. All my life I have been a 'collector' and my work has lain in the woods and fields, to my great delight and happiness, and now when old age and ill-health confine me to the house, I have the pleasures of reminiscence and my collection of shells.

Our President remarks that we 'do not know that any case of mimicry has been brought forward among the mollusca.' Is not *Trochus agglutinans* a case of mimicry for 'protection,' as the President terms it? If not, why does the creature fasten bits of shells and stones to its covering? I dredged it abundantly at Point Pedro, in the north of Ceylon, and always on ground covered with materials similar to those placed on its shell. Indeed, it was difficult to distinguish the shells from the rubbish in the dredge. I have known examples of this shell found in large fish. Can the attaching of this extraneous matter, by rendering them so similar to their surroundings, save them from being devoured?

In 1854, I was in the Comoro Islands, off the east coast of Africa. One day I took refuge under a bushy tree creeper from a shower of rain. I observed that the branches were covered with short stout spines. As the rain ran down the branches I was astonished to see some of the 'spines' move along the bark! On taking them in my hand was pleased to find that they were *Bulinini*! They were covered with a thick, scurfy epidermis, exactly like the spines of the creeper, from which I could not distinguish them, until I had touched them. When cleaned from the epidermis, they were clear shining brown. I have some still in my cabinet. I suppose our President knows the beautiful *Bulinus miltocheilus* Reeve, from

Solomon Isles, with its deep orange mouth. My son, who collected for me in these islands, tells me it is found on broad-leaved plants, on the leaves, and that the animal shines through the shell, a lovely green, and the orange mouth barely shows from the upper side, so that the shell is most difficult to find, approximating so closely to the green leaves on which it creeps. Surely these two cases are instances of protective mimicry ?

Further on, Mr. Mason alludes to the destruction of the epidermis in some shells 'by the action of the winds and the sharp angles of the drifting sands.' This reminds me of the action of sand (and heat) in New Caledonia, where I resided some seventeen years, on the magnificent *Bulimi* (*Placostyli*) found there. They are essentially forest shells, always found under trees, but one or two species—*Pl. porphyrostomus* and *Pl. mouackensis* for instance—are found in the low scrub of the sea littoral. Now, those found in the forests, where the large-leaved trees afford plentiful shade, have—even in the most adult examples—a lovely brown epidermis on the upper part, though the lower is almost always worn away down to the calcareous matter of the shell, by crawling on the rocks and stones. Those that live in the sandy littoral of the sea shore, where the scrub is open and the small-leaved trees give little shade, are invariably, when fully adult, deprived of their epidermis, while in youth they always possess it. They all burrow down into the soil, and I doubt not the 'sharp angles' of the hot sand (so hot that you can sometimes hardly bear to lay your hand on it) do a great deal to grind off their epidermis. There is a fine species from the Solomon Islands—*Pl. cleryi*—of which I am informed that not one in five hundred adults has the epidermis (I have a fine example), while the young have a lovely greenish one. I should like to know the life history of this species; where it is found, etc.

At page 338, our President mentioned the case 'where the normally coloured opaque bands become translucent.' I have some lovely examples of *Helix hortensis* of this nature, taken by

me in Lincolnshire over fifty years ago. A friend tells me the var. is named *arenicola* McGill., but I have a single example from M. Ancey, from the Jura, which he names var. *pellucida-fasciata*; this is a little different, but evidently *hortensis*.

In the same page Mr. Mason mentioned the peculiar epidermis of the Philippine Island species of *Bulimi* (*Cochlostyla*). One day I paid a visit to dear old Cuming. I was always admitted to his 'sanctum'—a privilege accorded to few,—I found him in a towering rage! He had sold a fine series of the Philippine shells to the King of Portugal, which had been presented to some national museum by His Majesty. The curator, thinking to make them 'look nicer,' rubbed oil over them! with the result that they all became a uniform brown, and had been returned to my old friend as 'shells painted by him'!!! He stormed and raged at the destruction of the beautiful specimens, but calmed down when I suggested their immersion in an alkali to remove the oil. This was done, and the shells, restored to their former beauty, were again sent to the King with an explanatory letter.

I have heard collectors say that Cuming's 'localities' were not to be trusted. I have seen him get out a collection of shells for a customer, so can throw a little light on the subject. He had a long table running along one side of his room in the upper story. He would walk along this with a basket of shells in one hand, a 'jumble' of shells!! He would pick out a pair, place them on the table, and dictate to his secretary (I never saw him write) name, author, and locality!! His memory of shells was 'prodigious'! but, of course, he was but human, and therefore liable to err.

***Hyalinia cellaria* m. *sinistrorsum*.** — Mr. C. W. Johnson records in the 'Nautilus' for December, the finding of a reversed specimen of this species at West Conshohocken, in Pennsylvania, U.S.A., by the late Mr. Robert Walton. This is, I believe, the first recorded instance of the occurrence of this monstrosity in this one of our most abundant species.—J. W. TAYLOR, December, 1893.

NOTE ON THE GENUS *BALEA*.

BY EDGAR A. SMITH.

(Read before the Conchological Society, March 14th, 1894).

IN the 'Journal of Conchology' (vol. vi., pp. 421-422), Mr. A. E. Craven and myself made some remarks on the viviparous nature of the genus *Balea*, believing at the time that it was with one exception the first record of this characteristic. I find, however, that such is not the case, and, therefore, in justice to a previous discovery I beg to call the attention of the Society to a paper by C. Hartman published in 1867.*

On page 385 of this treatise he mentions the fact that certain specimens of *Balea perversa* were capable of producing young before arriving at maturity, and also that he had observed within such immature examples, as well as in adult specimens, young shells consisting of two whorls. It therefore appears that Hartman was the first to record the viviparous nature of this genus.

Mr. T. Rogers† appears to have been cognisant of this fact a short time after the publication of Hartman's paper, but he did not then place it on record.

Both Jeffreys in 1869‡ and Rimmer§ in 1880 quote Mr. Rich's observation upon this subject.

I must plead as an excuse for having overlooked Hartman's discovery when writing my previous note upon this subject, the fact of having trusted to the most recent manuals on Conchology, such as Fischer's and Tryon's, to contain, if it were known, such an important fact as the viviparous character of this genus.

* Ofversigt Kongl. Vetenskaps-Akad. Förhandl. 1866 (published 1867) pp. 381-394.

† Journ. Conch., vol. vii., p. 40.

‡ Brit. Conch., vol. v., p. 161.

§ Land and Freshwater Shells British Isles, p. 169.

HYDROBIA (PALUDESTRINA) JENKINSI
AT LEWES.

By LIONEL E. ADAMS, B.A.

(Read before the Conchological Society, April 4th, 1894).

I HAVE just examined an interesting consignment of *Hydrobia jenkinsi* from Mr. C. H. Morris, of Lewes, who has discovered a large and, apparently, suddenly-arisen colony in a small tributary of the Sussex Ouse near Lewes. This colony is interesting in consisting, as far as can be judged from a few thousand specimens, entirely of the uncarinated form, the carination obtaining in the great percentage of specimens from all other known localities. In this journal (Jan. 1893) I hazarded the conjecture that this species was introduced in Baltic timber, and I mentioned Newhaven as a likely place for the shell to appear if the timber theory were correct. It is quite possible for the shell to ascend the eight miles between Newhaven and Lewes.

I have just returned from a cursory visit to Wisbech, King's Lynn, Sutton Bridge, etc., in search of *H. jenkinsi*, thinking it likely that the timber imported along the ports of the Wash might bring it there also; but in each case the rivers are too strongly tide-washed at the localities I visited for any shells to remain on the banks, but I expect that a further and more exhaustive search among the backwaters and marshes around the mouths of these rivers may establish its existence there.

Mr. Daniel's discovery of the shell in a Staffordshire canal is very interesting, but I have not yet been able to obtain particulars to throw light upon its supposed introduction there.

NORTHAMPTON, March 26th, 1894.

THE LAND AND FRESHWATER MOLLUSCA OF
EAST NORFOLK.

BY THE REV. S. SPENCER PEARCE, M.A., AND
ARTHUR MAYFIELD.

(Read before the Conchological Society, Nov. 1, 1893).

The following list of the Land and Freshwater Mollusca of East Norfolk is the combined work of Mr. Arthur Mayfield, now resident in Great Yarmouth, and of myself, who, during the years 1891-2, happened to be residing at Yelverton, a village five miles south-east of Norwich city. Mr. Mayfield's acquaintance with the molluscs of Norfolk has extended over several years. At my suggestion, he kindly offered to co-operate with me to work up the East Norfolk district as far as was possible. For this purpose I made myself responsible for the localities in the region lying to the south-east of the city, and stretching towards Bungay and Yarmouth. Mr. Mayfield, on his part, undertook the region on the other side of the city, which may roughly be described as the valley of the Wensum River, and localities on the west, north-west, and north-east of Norwich. The list with regard to the vicinity of Norwich is fairly complete. In many respects the district explored by us is singular, and may conveniently and properly be considered as falling into two areas, which in natural features are very distinct from one another. There is (1) *the low-lying marsh land* which constitutes the wide valley of the River Yare with its tributaries, the Wensum and the Taas; and that of the River Bure with its many tributary streams. In these valleys, the Bure and the Yare, which broaden out as the sea is approached eastward, are situated most of the famous Norfolk lakes of freshwater—the Broads. The number and the variety of the freshwater molluscs in this low-lying area is immense; and a

further interest attaches to these valleys, inasmuch as within the days of history they formed more or less arms of the sea.

The other area is (2) *the upland district* of low undulating hills which hardly rise higher than 100 feet above the sea. These uplands are chiefly arable land, in a high state of cultivation, for the most part treeless, and geologically composed of thick glacial beds of gravel, clay, and crag, resting upon the white chalk, which is not often visible except in cuttings and pits. These features sufficiently explain the molluscan phenomena of this Norfolk district, which are the abundance of species and individuals of all the freshwater forms; the paucity of the wood-loving species; and the great number and variety presented by the hedge-row kinds, as many of the true snails—*Helix aspersa*, *H. nemoralis*, *H. hortensis*, etc. The *albinos* seem to be fully represented, as this list will show.

The only former examination of the mollusca of Norfolk was that undertaken in 1872 for the Norfolk and Norwich Natural History Society, by Mr. Jno. B. Bridgman, and was published in the Proceedings of that Society, which still flourishes.

Mr. Bridgman chiefly collected in the neighbourhood of Norwich. The number of species recorded by him is eighty-four in all.

Arion ater (L.). Plentiful on the higher as well as in the marsh lands. The black form is usually found, but at Alington, Yelverton, and Rockland, the chocolate-brown shade is much the most plentiful (S.S.P.); St. Faith's, Colney, Thorpe, Postwick, and Costessey (A.M.).

A. hortensis Fér. Gardens, woods, and waste places, under stones and logs of wood. Whitlingham, Yelverton, Framingham Earl (S.S.P.); Heigham, Earlham, St. Faith's (A.M.).

Var. **grisea**. Heigham (A.M.).

Amalia sowerbyi (Fér.). A single specimen at Kirby-Bedon (A.M.).

- Limax maximus** L. Under logs of wood at Yelverton, Howe, near Whitlingham Church (S.S.P.); Kirby-Bedon, Heigham (A.M.).
- L. flavus** L. Outhouses and gardens, Yelverton, and Framingham Earl (S.S.P.); Norwich (A.M.).
- L. marginatus** (Müll.). Whitlingham Woods, on beech trees (S.S.P.); on willows at Eaton (A.M.).
- Agriolimax agrestis** L. Common everywhere (S.S.P. and A.M.).
- A. lævis** Müll. In the marsh lands, Bramerton, Surlingham Ferry, Whitlingham (S.S.P.); Costessey, Colney (A.M.).
- Testacella haliotidea** Drap. Sent to me from a garden in Aylsham, some miles to the north of Norwich (S.S.P.).
- Vitrina pellucida** (Müll.). Common in shady places, Yelverton Churchyard, Whitlingham Woods (S.S.P.); Heigham, Earham, Mousehold Heath, Stratton Strawless (A.M.).
- Hyalinia cellaria** (Müll.). Whitlingham Marsh, Rectory garden, Yelverton, Rockland St. Mary Churchyard, Framingham Earl, etc. (S.S.P.); Heigham, Earham, Lakenham, Norwich Cemetery, etc. (A.M.).
- H. alliaria** (Müll.). Local and gregarious, under stones and logs of wood, and at roots of trees; near Whitlingham Church (S.S.P.); Costessey, Earham, Caistor St. Edmund's Churchyard (A.M.).
- H. nitidula** (Drap.). Plentiful. Rockland St. Mary, Yelverton, Whitlingham Woods, etc. (S.S.P.); Heigham, Earham, Thorpe, Lakenham (A.M.).
- Var. **helmii** (Alder). Lakenham (A.M.).
- H. radiatula** (Alder). Among dead leaves and moss, Whitlingham Woods; under alders near Surlingham Ferry (S.S.P.); in a wood near river at Costessey (A.M.).
- H. pura** (Alder). On hedge-bank at Caistor (A.M.).
- H. crystallina** (Müll.). Whitlingham Woods (S.S.P.); Costessey, Heigham, and Earham (A.M.).
- Var. **contracta** (Westl.). Whitlingham Woods (S.S.P.).

H. fulva (Müll.) Under alders in the marsh at Surlingham Ferry, in Whitlingham Woods (S.S.P.); Earlham, Costessey Common, Eaton (A.M.).

H. nitida (Müll.). Whitlingham Marsh, Bramerton, under alders at Surlingham Ferry, near Stoke Holy Cross (S.S.P.); Colney, ditch-banks at Costessey Common (A.M.).

Helix rotundata (Müll.). Not at all uncommon in Norfolk, as some seem to have imagined. Under logs and dead wood and stones at Yelverton, Whitlingham, Rockland St. Mary (S.S.P.); Thorpe, Postwick, Carrow, Norwich, Costessey (A.M.).

H. pygmæa Drap. Generally distributed, by roadsides, on banks, and under stones and dead wood. Framingham Pigott, Yelverton Churchyard (S.S.P.); Heigham, Earlham, Hellesdon, Costessey Wood, etc. (A.M.).

H. aculeata (Müll.). Among dead leaves and moss, Heigham, Earlham, Stratton Strawless (A.M.).

H. pulchella (Müll.). On ivy-covered walls and under stones and moss, Yelverton Churchyard, Brooke Churchyard, Bramerton (S.S.P.); Heigham, Eaton, Earlham, Mousehold Heath (A.M.).

Var. **costata** (Müll.). With type on Yelverton Churchyard wall (S.S.P.); Earlham and Hellesdon (A.M.).

H. lapicida L. This was altogether an unexpected find for me. It is by no means uncommon on the palings round Mr. Christie's park at Framingham Pigott, on the bark of oak trees at the road-side between Yelverton and Framingham Earl Rectory, on palings at Halverston, also on hedge-banks at several spots between Bixley Mill and Yelverton (S.S.P.); on hedge-bank on chalky soil at Upper Hellesdon, Norwich, Kingland (A.M.).

Var. **nigrescens** Taylor. The specimens from Framingham Earl belong to this form (S.S.P.).

H. aspersa (Müll.). Very abundant everywhere (S.S.P. and A.M.).

Var. **minor** Moq. Frequently with others. Yelverton, Alington, Old Lakenham Churchyard, Trowse (S.S.P.); Heigham, Hellesdon (A.M.).

Var. **conoidea** Picard. Yelverton (S.S.P.).

Var. **grisea** Moq. Yelverton (S.S.P.); Hellesdon (A.M.).

Var. **exalbida** Menke. Not uncommon in hedges at Yelverton and Alington. A single example in Old Lakenham Churchyard with type and var. *minor* (S.S.P.); Thorpe, Hellesdon (A.M.).

H. nemoralis L. Common in hedges in company with the next species, which it outnumbers. We are able to record the following varieties:—

Var. **minor** Moq. Alington, two specimens, *libellula* ooooo (S.S.P.); Earlham and St. Faith's (A.M.).

Var. **roseolabiata** Taylor. Alington (S.S.P.); Earlham (A.M.).

Var. **libellula** (Risso). Common. Alington, Yelverton, Thurton, etc. (S.S.P.); Earlham, Catton, etc. (A.M.).

Var. **rubella** Moq. Fairly common. Thurton, Yelverton, etc. (S.S.P.); Earlham and Hellesdon (A.M.).

Var. **castanea** Moq. Not frequent. Alington (S.S.P.); Earlham, Horsham, St. Faith's (A.M.).

Var. **olivacea** (Risso). Rare. Alington (S.S.P.).

Var. **cornea**. Not unfrequent in the marsh land as well as in the uplands. Surlingham, Reedham (S.S.P.); Earlham (A.M.).

Var. **diaphana**. A single specimen at Yelverton (S.S.P.).

Var. **hyalozonata**. A single specimen at Earlham (A.M.).

H. hortensis Müll. Plentiful, though not so generally distributed as *H. nemoralis*. The form that predominates is the var. *albina* with var. *lutea*.

Var. **fuscolabiata** Taylor. Alington (S.S.P.).

Var. **albina** Moq. Alington, Rockland, Yelverton (S.S.P.); Catton, Old Lakenham (A.M.).

- Var. *lutea* Moq. Alington, Yelverton, Rockland, Hillington, Brooke, and Burgh Apton (S.S.P.); Catton and Old Lakenham (A.M.).
- Var. *incarnata* Moq. Unicolorous and banded, at Catton (A.M.).
- Var. *arenicola* Macgill. Kirby Bedon and Catton (A.M.); Yelverton (S.S.P.).
- Var. *tenuis* Baudon. Yelverton (S.S.P.).
- H. arbustorum** L. Common in the Yare valley, especially on the marsh land.
- Var. *cincta* Taylor (= var. *pallida* Jeffreys). Brundall and Surlingham (S.S.P.); Thorpe (A.M.).
- Var. *flavescens* Moq. Brundall and Surlingham (S.S.P.); Thorpe (A.M.).
- H. cantiana** Mont. Generally distributed, plentiful on all road-sides, hedges, and waste places where there are nettles. Hedenham, near Bungay, Yelverton, Alington, Burgh Apton, Bramerton, Poringland, Framingham Earl and Pigott, Reedham, Bixley, Stoke Holy Cross (S.S.P.); Eaton, Lakenham, Thorpe (A.M.).
- H. rufescens** Penn. Very abundant, especially in gardens (S.S.P. and A.M.).
- Var. *rubens* Moq. Earlham (A.M.).
- Var. *alba* Moq. Earlham (A.M.).
- Var. *depressa* Taylor. Catton (A.M.); Yelverton (S.S.P.).
- Mons. *subscalare* Williams. A single specimen at Eaton (Science Gossip, xxvii., p. 166).
- H. hispida** L. Very abundant, especially in gardens. The most abundant form is var. *hispidosa* Mousson (S.S.P. and A.M.).
- Var. *nana* Jeff. Banks of the Yare at Whitlingham (S.S.P.).
- Var. *depilata* Alder. Costessey Common (A.M.).
- H. granulata** Alder. Local. Among dead willow leaves at Costessey, Ringland, and Trowse (A.M.).
- Var. *cornea* Jeff. Costessey Common (A.M.).

H. itala L. (= *H. ericetorum* Müll.). Hedge-banks, fields, and dry places. Frequently with the following species. The commoner form is—

Var. **grisescens** Colbeau. Bramerton, turnpike at Bixley, Framingham, Yelverton, etc. (S.S.P.); Thorpe, Earlham, Bowthorpe, Hellesden (A.M.).

Var. **minor** Moq. On the Loddon Road-side, Earlham Road, Heigham, Norwich (S.S.P.); Bowthorpe, Earlham (A.M.).

H. caperata Mont. Very generally distributed by road-sides and under hedge-banks, also in cultivated fields (S.S.P. and A.M.).

Var. **major** Jeff. Stoke Holy Cross (S.S.P.); Eaton and Framingham Earl (A.M.).

Var. **gigaxii**. Plentiful (S.S.P.); Eaton (A.M.).

Var. **subscalaris** Jeff. Banks of New Cut, Reedham (S.S.P.); in a cultivated field at Eaton (A.M.).

Var. **ornata** Picard. Very rare. A single specimen on road-side near Stoke Holy Cross (S.S.P.).

Var. **bizonalis** Moq. Yelverton (S.S.P.).

Var. **lutescens** Pasc. Yelverton (S.S.P.); Eaton (A.M.).

Var. **obliterata** Picard. An arable field near Yelverton (S.S.P.).

Var. **alba** Picard. Road-side at Drayton (A.M.).

H. virgata Da Costa. On road-side banks, between Old Lakenham and Bracondale Hill, Yelverton (S.S.P.); Heigham, Hellesdon, Drayton, Mundesley (A.M.).

Var. **subalbida** Poiret. Earlham Road, Norwich; near Old Lakenham (S.S.P.).

Var. **albicans** Grat. With above at both places (S.S.P.); Hellesdon (S.S.P.).

Var. **subdeleta** Ckll. Yelverton (S.S.P.); Hellesdon, Mundesley (A.M.).

Buliminus obscurus (Müll.). Local. Earlham, Poringland, Eaton (A.M.).

Pupa cylindracea (Da Costa) (= *P. umbilicata* Drap.).

Confined mostly to ivy-covered walls. Yelverton Churchyard, Howe Churchyard (S.S.P.); Earlham, Weston Churchyard, Thorpe, Kirby Bedon (A.M.).

P. muscorum L., var. **unidentata** C. Pfr. (= *Pupa marginata* Drap.). Very local. Bawburgh, Ringland, Hellesdon, Bramerton (A.M.).**Vertigo pygmæa** (Drap.). A single individual under a stone in Yelverton Churchyard (S.S.P.); among stones at Earlham, under leaves at Costessey and Ringland (A.M.).**V. pusilla** Müll. Rare. On hedge-banks at Earlham and Bowthorpe, a single specimen at Bramerton (A.M.).**V. edentula** Drap. Rare. Among dead leaves in a wood at Costessey, hedge-bank at Earlham (A.M.).**Clausilia rugosa** Drap. On old walls, hedge-banks, and among dead leaves. Yelverton Churchyard, Framingham Earl, Whitlingham Woods (S.S.P.); Heigham, Earlham, Thorpe, etc. (A.M.).

Var. **everetti** Miller. Earlham (A.M.).

Var. **tumidula** Jeff. Whitlingham Woods (S.S.P.).

Var. **albina** Moq. Several individuals on Yelverton Churchyard wall, 1891 (S.S.P.).

C. laminata (Mont.). Rare. Among fallen ash leaves at Costessey, a single specimen on hedge-bank at Framingham Earl (A.M.); it used to occur in time past in the woods at Whitlingham, and may still exist there, though I spent a day searching for it in vain last autumn (S.S.P.).**Cochlicopa lubrica** Müll. Common and generally distributed in the higher parts as well as the marsh lands. Rockland St. Mary Churchyard, Yelverton, Surlingham Ferry, Whitlingham Woods and Marsh (S.S.P.); Heigham, Earlham, Thorpe, Costessey (A.M.).

Var. **lubricoides** Fér. Whitlingham Marsh (S.S.P.).

Succinea putris L. Banks of the Bure at Salhouse, also by the Yare at Brundall, Reedham, Bramerton, stream near

Burgh Apton Church (S.S.P.); Costessey Common, Colney, Thorpe (A.M.).

- S. elegans** Risso. With *S. putris* often. Bure banks near Yarmouth, Salhouse Broad, Surlingham, Brundall, Bramerton, Whitlingham, Trowse, Stoke Holy Cross (S.S.P.); Banks of Wensum at Heigham, Hellesdon, and Costessey, Thorpe, Lakenham (A.M.).

Var. *pfeifferi* Rossm. With type at Heigham.

- Carychium minimum** Müll. Abundant in damp shady places amongst dead leaves. Surlingham Ferry, Whitlingham Woods, Bramerton (S.S.P.); Costessey, Stratton Strawless, Haynford, Earlham (A.M.).

- Segmentina nitida** (Müll.). Local. Whitlingham Marsh opposite Thorpe village (S.S.P.); plentiful in a ditch at Thorpe (A.M.).

- Planorbis fontanus** (Lightfoot). Ditches at Bramerton, Horning Ferry, and near Whitlingham Church (S.S.P.); Colney and Hellesdon (A.M.).

- P. nautilus** (L.). Not plentiful. Ditch near Horning Ferry on the River Bure (S.S.P.); pond at Bawburgh (A.M.).

Var. *laevigata* Adami. Pond on Mousehold Heath, Norwich (A.M.).

- P. albus** (L.). Ditches at Acle and Horning Ferry, in River Yare on *Nuphar* leaves at Brundall and Coldham Hall, the Taas at Stoke Holy Cross (S.S.P.); ditches at Colney and Hellesdon (A.M.).

- P. spirorbis** Müll. Plentiful in a ditch at Thorpe (A.M.); Whitlingham, Bramerton, Brundall, Surlingham Ferry, ditch near Reedham New Cut, ditches at Stoke Holy Cross, at Acle, Horning Ferry, Horsey Mere, Heigham Bridge, etc. (S.S.P.).

- P. vortex** (L.). With the preceding, and also alone. Brundall, Bramerton, Stoke Holy Cross, Acle, Reedham, Whitlingham (S.S.P.); Colney, Heigham, Hellesdon, Thorpe, Costessey, etc. (A.M.).

P. carinatus Müll. Common, though more local than next species. Ditch at Acle, Horning Ferry, Heigham Bridge, ditch by side of New Cut, Reedham, ditches by River Taas at Stoke Holy Cross, Whitlingham (S.S.P.); ditches at Colney, Heigham, Hellesdon, etc. (A.M.).

Var. **disciformis** Jeff. With type at Colney (A.M.).

P. umbilicatus Müll. Very common and abundant (S.S.P. and A.M.).

P. corneus (L.). Ditch at Acle, Bramerton, Postwick Grove, Whitlingham Marsh (S.S.P.); Colney, Thorpe (A.M.).

P. contortus (L.). Not at all uncommon. Ditches near Whitlingham Church, Bramerton, Surlingham, Brundall, Buckenham Ferry, and Stoke Holy Cross, in the Bure Valley at Acle and Horning Ferry, where it affects the form *minor* (S.S.P.); very plentiful at Colney, Thorpe, Postwick (A.M.).

Bullinus hypnorum (L.). Decidedly rare. In a ditch at Thorpe, in company with *Planorbis spirorbis* and *Pisidium fontinale* (A.M.).

Monst. **decollatum** (Nelson). With type at Thorpe (A.M.).

Physa fontinalis (L.). Common, and generally distributed (S.S.P. and A.M.).

Amphipeplea glutinosa (Müll.). Local. In a ditch at Colney, in the River Wensum at Heigham and Hellesdon (A.M.).

Var. **albida** Williams. A single specimen at Colney (Science Gossip, xxvi., p. 232).

Limnæa peregra (Müll.). Common everywhere, and indulging in all kinds of variation (A.M. and S.S.P.).

Var. **lacustris** Leach. A form found in the Yare and Bure valleys at Ranworth Broad and near Brundall (S.S.P.).

Var. near **vulgaris**. Mr. Taylor calls my attention to this form, which I took in a ditch near Horsey Mere (S.S.P.).

Var. **inflata** Kob. Ranworth Broad, and also in a ditch at Acle (S.S.P.).

Var. *margaritana* Esm. Heigham (A.M.); Acle (S.S.P.).

Var. *candida* Porro (= *albida* Lister Peace). Ditch by side of New Cut near Reedham (S.S.P.).

L. auricularia L. Generally distributed, especially in the rivers and larger streams. River Yare between Norwich and Brundall, in the Bure above Acle Bridge, Thurne Stream, Heigham Sounds, Old Meadow Dyke (S.S.P.); in the River Wensum at Heigham and Hellesdon (A.M.).

L. stagnalis L. Plentiful. Acle, Bramerton, Whitlingham Marsh, Stoke Holy Cross (S.S.P.); Old Lakenham, Earham, Weston, etc. (A.M.).

L. palustris (Müll.). Common in the marshes. Bramerton, Whitlingham, Brundall, Buckenham, Reedham, near Acle (S.S.P.); Colney, Thorpe, Postwick, Costessey, etc. (A.M.).

Var. *tincta* Jeff. Not uncommon with type at Brundall, Reedham (S.S.P.).

Var. nov. *carinata*. Shell with body-whorl strongly keeled. Occurs with type and the var. *tincta* in a ditch by the side of the New Cut, Reedham (S.S.P.).

L. truncatula (Müll.). On the banks of the Yare at Bramerton, in ditches on Costessey Common (A.M.).

Ancylus fluviatilis Müll. On stones and water-lily leaves in the River Wensun at Hellesdon (A.M.).

Velletia lacustris (L.). On *Nuphar* leaves, etc. At Brundall, Whitlingham, Surlingham, in the Yare, and at Acle and Heigham Bridge (S.S.P.); River Wensum at Heigham and Hellesdon (A.M.).

Var. *compressa* (Jeff.). At Brundall, in the River Yare (S.S.P.).

Cyclostoma elegans Müll. Rare. In Whitlingham Woods; on a hedge-bank at Drayton (A.M.).

Neritina fluviatilis (L.). In the River Yare at Surlingham Ferry and Brundall, in the Bure between Salhouse Broad and Horning, also in Old Meadow Dyke, Thurne Stream,

Horsey Mere, and Heigham Sounds (S.S.P.) ; in the River Wensum at Heigham and Hellesdon (A.M.).

Var. *pallida* Pascal. With type at Heigham (A.M.).

Var. *trifasciata* Colb. Heigham (A.M.).

Viviparus contectus (Millet). River Bure at Acle, Horning, Wroxham, also at Bramerton, Surlingham, Brundall, in the River Yare (S.S.P.) ; ditches in the Wensum Valley at Heigham, Hellesdon, and Costessey, ditches at Colney and Thorpe (A.M.).

V. viviparus (L.). As abundant as the preceding species, and generally taken with it. Brundall, Bramerton, Surlingham, in the Yare ; at Wroxham and Horning Ferry, in the Bure (S.S.P.) ; Heigham, Hellesdon, and Postwick (A.M.).

Bythinia tentaculata (L.). Most abundant in all the streams and ditches of the Yare, Bure, and Wensum Valleys (S.S.P. and A.M.).

B. leachii (Shepp.). Ditch at Horning Ferry, Acle, by New Cut at Reedham, Whitlingham, and in the Taas tributary at Stoke Holy Cross (S.S.P.) ; Colney, Heigham, Thorpe (A.M.).

Var. *elongata* Jeff. Surlingham Ferry (S.S.P.).

Valvata piscinalis (Müll.). Very plentiful in ditches, streams, and broads of the Yare and the Bure rivers (S.S.P.) ; at Colney, Costessey, especially abundant at Thorpe (A.M.).

V. cristata Müll. Plentiful. Ditches at Horning Ferry, Postwick Grove, ditch at Whitlingham Marsh (S.S.P.) ; Arminghall, Thorpe, Colney, etc. (A.M.).

Unio pictorum L. In the River Yare abundant, Postwick, Whitlingham, Trowse, Surlingham, Brundall ; in the Bure valley it is common at Wroxham and Acles Bridges, also in Thurne Stream and Heigham Sounds (S.S.P.) ; River Wensum at Heigham and Hellesdon (A.M.).

Var. **compressa** Jeff. Most abundant at the bends of the River Yare near Surlingham Ferry and Bramerton Woods End. At low tides it is possible to obtain hundreds with the hands, and there is represented in this locality every gradation of form between the type and this remarkable variety (S.S.P.). Mr. Bridgman, in 1872, was the first to notice this variety, and in his list thinks that its distinctive form "may be caused by the swiftness of the current carrying "away the loose particles of soil and leaving a very hard "bottom for the shell to live in."

Anodonta cygnea L. In the River Wensum at Heigham and Hellesdon (A.M.); in the Yare and Bure Rivers—in the former at Postwick and Bramerton, etc., and in the Bure everywhere above Acle (S.S.P.).

A. anatina L. In the Wensum at Heigham and Hellesdon (A.M.); in the Rivers Yare and Bure (S.S.P.).

Sphærium corneum (L.). Common in Yare and Bure Valleys; ditches, Bramerton, Surlingham Ferry, Whitlingham Marsh, Brundall, Stoke Holy Cross, Acle, Halvergate, Horning Ferry, Thurne Stream, Old Meadow Dyke, Salhouse and Ranworth Broads (S.S.P.); ditches at Colney, Haynford, Costessey (A.M.).

Var. **flavescens** (Macgill.). Horning Ferry, Brundall (S.S.P.); Colney (A.M.).

Var. **nucleus** (Stud.). Near Bramerton and Whitlingham (S.S.P.).

Var. **pisidioides** Gray. Ditches at Brundall (S.S.P.); and Colney (A.M.).

S. lacustre (Müll.). More local than preceding, but plentiful in both Bure and Yare valleys. Surlingham Ferry, Brundall, Horning Ferry (S.S.P.); Thorpe, Old Lakenham, and Colney (A.M.).

Pisidium amnicum (Müll.). In the River Yare at Bramerton, Brundall, Coldham Hall, as well as in the tributary

stream the River Taas at Stoke Holy Cross (S.S.P.); in ditches at Colney, Thorpe, and Old Lakenham (A.M.).

P. fontinale (Drap.). Common. Ditches at Stoke Holy Cross, Surlingham Ferry, near Horning Ferry, shallow part of Ranworth Broad (S.S.P.); Thorpe, Old Lakenham, Swainsthorpe, Costessey (A.M.).

Var. **pulchella** Jenyns. Ditch at Colney (A.M.); with type at Stoke Holy Cross (S.S.P.).

P. pusillum (Gmelin). Shallow water. Hickling Broad (S.S.P.); in a ditch in wood at Costessey, Old Lakenham (A.M.).

P. milium Held. Sparingly in a ditch at Old Lakenham (A.M.).

All the above species, except those enclosed in brackets, have been submitted to the inspection of Mr. Taylor and Mr. Roebuck, of the Conchological Society, and we have to thank them for undertaking to look them through and making several suggestions. Two species recorded by Mr. Bridgman have eluded our notice so far, namely, *Acicula lineata*, two specimens of which were recorded from Caistor Woods; and *Cæcilioides acicula* Müll., which I am rather surprised at not having taken dead or alive.

Dreissensia polymorpha Pallas.—Would you allow me to ask of any of your readers whether the proper name of this species should not be *D. volgensis*? Pallas's name was published before 1758, the starting-point of our nomenclature, and included both a marine and freshwater form. Either of the above two reasons seem sufficient to invalidate the use of the name.—A. A.

Obituary.

Charles Ashford.

Few persons have in recent years done more to advance the philosophical study of shells, and the animals forming them, than the subject of the present notice, who died suddenly from apoplexy on the morning of January 31st of the present year.

Charles Ashford was born at Baldock, Hertfordshire, on January 7th, 1829, and when nine years old was sent to the Friends' School at Ackworth, Yorkshire, where he remained as scholar and teacher for a period of thirteen years, and where he imbibed that strong love for conchology and other sciences that distinguished him, and which he pursued with such marked success in after life.

Astronomy at one time, while at college, claimed a large measure of his attention, and in his ardent pursuit of this study he injured to some extent his right eye, which reduced him in after years to the use of the left eye for all minute and critical work.

He left Ackworth in 1854, but before doing so compiled a list of the Mollusca of Ackworth, which was published in the 'Zoologist' for April, 1854.

For four years, 1875—8, he devoted his leisure time to the study and collection of the Eocene Fossils from the freshwater deposits at Hempstead, Sconce, Colwell Bay, Totland Bay, and Headon Hill, in the Isle of Wight, and amassed some very beautiful examples of these interesting remains.

From the beginning of 1880, the time of his permanent settlement at his brother's home at Christchurch, dates his active prosecution of the study of the anatomical structure of the mollusca, which he followed with such success until his death, patiently amassing information upon the structure and physiology of many species, elucidating his observations by careful and conscientious measured drawings of the more important organs. He first gave attention to and studied the British Dart-bearers, the results of which were published in

an elaborate and detailed article in the 'Journal of Conchology' entitled 'The Darts of the British Helicidæ.'

During a portion of the last decade he was closely associated with Mr. W. Denison Roebuck, of Leeds, in the revival of Limacology, a study which had been neglected and practically dormant in England since the days of the Rev. B. J. Clarke. During the whole of the period when Mr. Roebuck was so successfully devoting his attention to and creating an interest in the British slugs, Mr. Ashford was closely identified with him, and to Mr. Ashford is due much of the credit of eliminating the species from the chaos in which they were involved, and of placing the British species of the naked genera on an unassailable basis by his careful and accurate drawings of their anatomical peculiarities and distinctive characters. A convincing proof of the thoroughness and comprehensiveness of their joint labours is evidenced by the fact that only one genuine and undoubted species—*Arion minimus*—has been added to the British list with which Mr. Ashford or Mr. Roebuck have not been in some way identified.

The genus *Testacella* was also studied by Mr. Ashford with marked results, his investigations establishing firmly the validity of *Testacella scutulum* as a thoroughly distinct species, and proving the error of the accepted opinions which regarded it as a simple variety of *Testacella haliotideæ*, from which he showed it to differ very markedly in its organization.

Evidence of his diligence in his scientific studies is amply furnished by the following list of some of the more important papers he wrote, embodying the results of his investigations and researches:—

- 'A List of the Land and Freshwater Shells found in the neighbourhood of Ackworth, Yorkshire.'
- 'On the Habits of *Helix fusca*.'
- 'Note on *Limnæa glutinosa* Müller.'
- 'Land and Freshwater Shells observed in the neighbourhood of Redcar.'

‘Suggestions for a Serial Arrangement of the Variations of our Banded Land Shells.’

‘*Bulimus acutus* var. *bizona* in the Isle of Wight.’

‘Note on *Bulimus heterostomus* of the Eocene, Isle of Wight.’

‘Notes from the Isle of Wight.’

‘Destruction of Shell-life by Floods.’

‘Note on the Anatomy of *Helix hispida* and *H. cantiana*.’

‘A List of the Shells of the Lower Tees District, Yorkshire.’

‘On the Action of the Heart in the *Helicidæ* during Hibernation.’

‘The Darts of the British *Helicidæ*.’

‘Note on the Anatomy of *Helix sericea* Müll.’

‘Land and Freshwater Mollusca round Christchurch, South Hants.’

His wealth of knowledge upon the mollusca was freely and unselfishly given to everyone who desired information, and by the writer and many others he was consulted upon every point of difficulty, his wise and moderate counsels being valued and appreciated. Few will miss his wise and friendly help more than the writer, who was closely associated with him for a number of years, constantly receiving help and assistance in our mutual study, his kindly and unselfishly generous nature and actions endearing him more and more and rendering his lamented death harder to be borne. The autograph, etc., accompanying the portrait of our late dear friend and colleague, has a melancholy interest attached, as they were part of a letter addressed to the writer, the last he ever wrote, only just before retiring to rest the evening before his lamented death.

The beautiful collection of British land and freshwater shells formed by him has generously been placed for a time in the Leeds Museum, under the care of the Conchological Society, and it is hoped that every conchologist who can make it convenient will endeavour to avail himself of the opportunity to examine the instructive series Mr. Ashford brought together with so much pains and labour.

NOTE ON SOME MOLLUSCAN REMAINS LATELY
DISCOVERED IN THE ENGLISH KEUPER.

By R. BULLEN NEWTON, F.G.S.

(Read at the British Association, Nottingham Meeting, 1893, and before
the Conchological Society, 3rd Jan., 1894).

THE green gritty marls of the Upper Keuper Sandstone of Shrewley, Warwickshire, have recently yielded some obscure impressions of Lamellibranch shells, which are of extreme interest as affording the first evidence of a molluscan fauna from these beds as developed in this country. Unfortunately, the matrix containing them is so peculiarly unfavourable for the retention of shell structure that it is very unlikely any better material than the present will ever be obtained. The specimens indicate truly marine types, though on account of their imperfect preservation only a few of them could be selected for description, as exhibiting certain characters in their contours and sculpturing, which might be of service in ascertaining their probable generic positions. So sparingly are fossils found in this division of the British Trias that up to the present time only one form of invertebrate has been recorded, viz., the small phyllopodous crustacean, *Estheria minuta*; that is, excluding some Foraminifera described by Professor T. R. Jones and Mr. W. K. Parker,¹ which came from an alabaster pit, near Derby, and which were doubtfully referred by the authors to an Upper Triassic age. The very modern facies of these Foraminifera has suggested the highly probable idea that they were derived from superficial deposits.² Scattered through the matrix containing the Lamellibranch impressions are portions of

¹ 'On some Fossil Foraminifera from Chellaston, near Derby,'—Quart. Journ. Geol. Soc., 1860, vol. 16, pls. 19—20, pp. 452—458.

² *Vide* 'The Geology of England and Wales,' by H. B. Woodward, 1887, 2nd ed., p. 228.

Cestraciant spines and teeth (*Acrodus Keuperinus*), besides a fragmentary carapace of the crustacean previously mentioned.

The credit of this discovery is shared between the Rev. P. B. Brodie, M.A., F.G.S., and Mr. E. P. Richards, of Warwick, both of whom have devoted considerable time in studying the palæontological features of the section at Shrewley Quarry. Since Murchison and Strickland¹ first directed attention to the geological structure of the Keuper-beds of this locality, we have been mainly indebted to Mr. Brodie² for any subsequent details on the subject, his last contribution, only recently issued, referring to the occurrence of the molluscan remains now under review.

The author has had access to the whole of the specimens contained in Mr. Brodie's collection as well as to a smaller series collected by Mr. Richards, and deposited by him in the Geological Museum at Jermyn Street. For the loan of the latter the author desires to thank Sir Archibald Geikie, F.R.S.

DESCRIPTION OF SPECIMENS.

Thracia (?) *Brodiei* sp. nov.

The impression illustrated by fig. 1, and which is drawn natural size, appears to represent a left valve belonging to a somewhat oval and compressed shell. It measures 29 millimetres in height and 31 mill. in length. The original length of the specimen is uncertain as its posterior portion is absent. Anterior area extensive, with a rounded margin; umbo situated either mesially or posteriorly and taking a slightly posterior direction;

¹ 'On the Upper Formations of the New Red Sandstone System in Gloucestershire, Worcestershire, and Warwickshire.'—*Trans. Geol. Soc., London*, 1840, Ser. 2, vol. 5, pl. 28, pp. 331—348.

² 'On the Upper Keuper Sandstone (included in the New Red Marl) of Warwickshire.'—*Quart. Journ. Geol. Soc.*, 1856, vol. 12, p. 374.

'Notes on the Upper Keuper Section at Shrewley, where the fish (*Semionotus Brodiei*) were found, and on the Trias generally in Warwickshire.'—*Ibid.*, 1887, vol. 43, p. 540.

'On some Additional Remains of Cestraciant and other Fishes in the Green Gritty Marls, immediately overlying the Red Marls of the Upper Keuper in Warwickshire.'—*Ibid.*, 1893, vol. 49, p. 171.

'On the Discovery of Molluscs in the Upper Keuper at Shrewley, in Warwickshire.'—*Ibid.*, 1894 (May), vol. 50, p. 170.

ventral margin curved and ascending soon after passing the umbonal axis; posterior line runs obliquely from the umbo; ornamentation consists of concentric furrows, more or less obscure on the central and umbonal regions, but distinct elsewhere; one more prominent than the others near the ventral margin probably indicates the position of the pallial line. There is an absence of radiating striæ.

Thracia (?) Brodiei.



Fig. 1.
(Nat. size).

OBSERVATIONS.—Great difficulty is felt in assigning this impression to any particular genus, but taking into account the preponderance of its anterior region, the possibility of an attenuated posterior end as suggested by the obliquity of the posterior line and the rather rapidly ascending ventral margin, together with the fact that the original shell structure was of a most delicate description as evidenced by the distinctness of the concentric markings, we may venture to regard it as belonging to the family of the Anatinidæ and most possibly to the genus *Thracia*. It may be recognized, at any rate, provisionally, under the name of *Thracia (?) Brodiei*.

Another species of this genus, mostly found as casts, called *Thracia mactroides* Schlotheim¹ sp., has been recorded from the Muschelkalk and Keuper strata of Germany, but there appears to be no need to confound it with the British form, which is anteriorly deeper in contour, generally larger, and with the umbo directed rather more posteriorly.

¹ 'Nachträge Petrefactenkunde,' 1823, part 2, pl. 33, fig. 4, p. 109.

The specimen figured is in the collection of the Rev. P. B. Brodie, of Rowington, Warwickshire.

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Pholadomya (?) Richardsi sp. nov.

The specimen represented by fig. 2 (drawn twice natural size), exhibits an impression of a left valve of a transversely elongate and oval-shaped shell; it is, besides inæquilateral in contour, having the umbo placed anteriorly. The cardinal margin slopes gradually down each side, whilst the ventral line is much curved. The surface ornament consists of a series of costæ or ribs radiating from the umbo and extending without interruption over the entire valve including the anterior and posterior areas. These ribs are coarser and straighter in the centre, but become slightly concave in their descent, closer and somewhat finer over the terminal portions of the shell. There are no indications of lines of growth crossing the costæ.

DIMENSIONS.—23 mm. in length by 11 mm. in height.

OBSERVATIONS.—This specimen bears a general resemblance to an *Arca* or a *Cardium*, but in both these genera the tests are usually too thick for their external sculpture to be observed within the valve; and in their casts only muscle marks and pallial impressions would mostly be seen. We must therefore regard our shell as having possessed an extremely thin-tested structure such as exists in *Pholadomya*. Although it is rather rare for *Pholadomya* to exhibit radiating ribs over the whole posterior area, we can cite a precedent in Agassiz's species *P. multicosata** from the Portlandian rocks of Switzerland, where the entire valve is ornamented in this manner. As a provisional arrangement, I shall, therefore, refer the Keuper shell to this genus, and name it *Pholadomya (?) Richardsi*.

This specimen (fig. 2) was obtained by Mr. E. P. Richards, and is now in the Geological Museum at Jermyn Street (No.

* *Études Critiques Mollusques Fossiles* (Myes), 1842, pl. 2 III, fig. 8, p. 52.

4980). A small fragment of another shell, probably belonging to this species, is in Mr. Brodie's collection, and is shown in fig. 3.

Pholadomya (?) *Richardsi*.

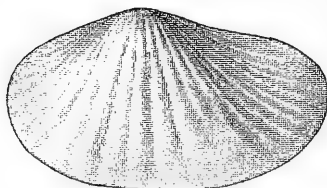


FIG 2.
(Enlarged twice).



FIG 3.
(Enlarged twice).

Nucula (?) *Keuperina* sp. nov.

Fig. 4 (drawn twice natural size) represents the right valve of an oval-shaped shell having its umbo situated either mesially or slightly on the posterior side. The anterior area is rather more extensive than the posterior, and the margins are round. The sculpture, which is most obscure, appears to consist of a series of acutely sinuated striae, which ornaments the upper half of the valve, whilst below these occur a few concentrically arranged sulcations or lines of growth.

DIMENSIONS.—20 mm. in length, 14 mm. in height.

OBSERVATIONS.—A fragment of this shell in Mr. Brodie's collection (fig. 5) was mistaken for a portion of *Goniomya* at the time when my paper was read at the British Association† last year. The present specimen being more complete has enabled me to rectify this determination. Instead of having a central set of v-shaped ribs fitting into one another beneath the umbo, as in the true *Goniomya*, this impression shows the sinuated striae continued over the upper portion of the valve, thus presenting a series of zig-zags or divarications. Some *Nuculae* exhibit a somewhat similar character, as for instance *Nucula Cobboldiae* J. Sowerby, from the Crag formation, though the

† For abstract of this see the 'Geological Magazine,' 1893, p. 557.

species recorded by Alberti† from the continental Keuper do not possess this peculiar ornamentation. It is, however, with much hesitation that I attach this generic name; but, as a temporary measure, and for the sake of convenience, it may be regarded as *Nucula* (?) *Keuperina*, the specific designation being of service in fixing its stratigraphical position.

The specimen (fig. 4) was collected by Mr. E. P. Richards, and is now in the collection of the Geological Museum (No. 4979).

Nucula (?) *Keuperina*.

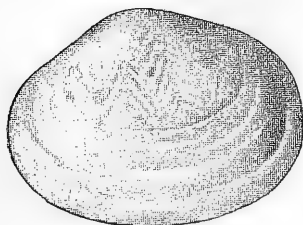


FIG. 4.
(Enlarged twice).

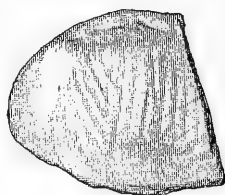


FIG. 5.
(Enlarged twice).

CONCLUSION.—The unsatisfactory nature of these Keuper shell-relics has compelled me to place them under somewhat provisional determinations, though their uniqueness, as illustrating the first proofs we possess of a molluscan fauna from this formation, is a sufficient excuse for having stamped them with doubtful generic designations. Until better specimens are available, the present record may be of interest in adding some further facts to the faunistic list of British Triassic rocks.

I wish to thank Mr. George Sharman, palæontologist of the Geological Museum, for having directed my attention to Mr. Richards' specimens in that institution, the existence of which I was ignorant of until quite recently.

† Ueberblick über die Trias, &c., 1864.

Hydrobia (Paludestrina) jenkinsi at Lewes.—

Referring to Mr. Lionel E. Adams' paper upon my recent discovery of this species, it may be interesting to note that the shell is increasing in numbers enormously. I visited the stream a short time ago, and found the weeds covered with them; a gallon could be collected with a net in a very short space of time. It is a most extraordinary thing that I have never found it before this year, because I, as well as others in the town, have worked the locality regularly for many years. If I had only taken a few specimens I can understand that we might have overlooked it, but how are such numbers to be accounted for? I have also recently discovered it in a ditch close to the river, quite disconnected from the previous locality; this place, however, I had never worked before, therefore I was not so much surprised at finding it.—C. H. MORRIS, Lewes, 18th July, 1894.

Hydrobia jenkinsi Smith.—Whilst journeying to Willenhall by Midland Railway, as I passed Short Heath Station I noticed that one of the locks of the canal was dry, owing to some repairs being done. I thought this would give me a good opportunity for examining the bed; so after lunch I went to it, and found a great quantity of *Hydrobia jenkinsi*, together with *Unio tumidus*, *U. pictorum*, *Anodonta cygnea*, a few *Paludina vivipara*, *Bythinia tentaculata*, and *Limnæa peregra*. The bed was literally covered with the *Hydrobias*; you could scoop them up by hundreds, and I found on reaching home that I had close on 2,000! I should fancy they have been established several years.—H. OVERTON, Brookdale, Tudor Hill, Sutton Coldfield, 1st Nov., 1894.

Succinea oblonga in Jersey.—Mr. J. T. Marshall informs me that he was fortunate in finding this species in Jersey, last summer, five specimens being obtained.—J. W. TAYLOR.

ON DREISSENSIA POLYMORPHA PALLAS.

BY PROF. DR. E. V. MARTENS.

(Read before the Conchological Society, Aug. 22nd, 1894).

To the question brought forward in the last number of the 'Journal of Conchology,' (page 404), concerning *Dreissensia polymorpha* or *volgensis*, I may be allowed to answer that Pallas's voyage in Southern Russia and Siberia, on which he detected this shell, was in the years 1768-1770. He found the said shell at the mouth of the Jaik or Ural river, in August, 1769, and the first volume of his work on his voyage in which this shell is described, was published in 1771; an abbreviated German edition, published in 1776, is now before me, in which at page 26 of the appendix the description of *Mytilus polymorphus* is given in full. Further, the name and description is given also in Schroter's 'A Geschichte der Flussconchylien,' 1779, page 197. It is therefore a mistake to surmise that the name *Mytilus polymorphus* was given before 1758, and should yield to *M. volgensis* Chemn., all the said publications being between 1758 and 1795, the date of Chemnitz's '*Mytilus e fluvio Wolga*' (not '*volgensis*') in the xi. volume of his 'Conchylien Cabinet,' page 256.

Neither is the circumstance that Pallas has distinguished a *M. polymorphus marinus* and *fluvialis* of any value for the rejection of the name. Pallas states in the description of his voyage that he did find some of his shells in the river Jaik itself, and others in a living state on the shore of the island Kamenoi, at the mouth of this river in the Caspian Sea. Those from the river were of larger size and angulated, those from that island smaller and not so sharply angulated; but, nevertheless 'præsertim versus nates carinata.' With regard to the size, he

compares the former to the kernel of a plum (*prunum*), the latter to that of a date. In the 'Museum fur Naturkunde,' at Berlin, there are specimens given by Pallas himself, who died at Berlin in 1811, a year after the foundation of the university and its zoological collections in Berlin, and these specimens answer very well to the description of both the fluviatile and marine form, differing in size, relative breadth, sharpness of the keel, curvature of the beaks, and in colour as much as do specimens which are collected now on the Havel river near Berlin; there can be no doubt that all belong to one species. It is true that Pallas mentions the characteristic septum at the close of the whole description immediately after the distinguishing features of the form *fluviatilis*, but I am convinced that it is meant for both forms, as the preceding words—'natibus acutis deorsum inflexis'—for *fluviatilis* correspond to the last words for *marinus*—'nates acuminatæ subdeflexæ.' Bourguignat's surmise that the marine form described by Pallas was *Mytilus edulis*, is contradicted by the description itself, which distinguishes it expressly from *Mytilus edulis*. I think, therefore, that there is no reason to oppose the specific name *polymorpha*.



Wollaston's 'Testacea Atlantica.'—On the cover is a notice offering for sale the collection of shells of the late T. Vernon Wollaston, the author of 'Testacea Atlantica.' This collection constituted the basis of the work, and was formed by Mr. Wollaston with the assistance of Lowe, Paiva, and others. It comprises about 380 recent and 74 sub-fossil species, besides numerous varieties. The shells from each island are kept separate to show the variations thus occasioned. They are all contained in carefully-labelled glass-topped boxes, and as a typical and well-selected geographical collection, would be most valuable for reference in any public museum.—
E. L. LAYARD.

BIOLOGY OF *SPHÆRIUM CORNEUM*.

By HENRY CROWTHER, F.R.M.S.

(CURATOR OF THE LEEDS MUSEUM).

(Read before the Conchological Society, with microscopical demonstrations,
March 14th and April 4th, 1894).

THIS bivalved mollusc is common in that portion of the Leeds and Liverpool Canal which runs through the western side of Leeds, especially between the forges, into which hot water is continually being discharged from condensers and twyers and is aerated by opening lock-gates and over-flow goits.

These little pelecypods present many points of interest. I offer one or two for consideration. If put into a tall glass vessel of water they will be seen to travel up its sides, with ease, by the alternate expansion and contraction of the foot which each possesses. An animal in a shell half-an-inch in length crawled one inch in four minutes, lifting its shell three-eighths-of-an-inch at each contraction. At various heights on the sides of the vessel the molluscs anchor themselves by means of molluscan threads, often several in number, which appear as mucous prolongations of the mantle, and are dirty-looking from entangled organic matter, desmids, and other algal cells. As the animals seek higher levels they come to the surface film of the water and there anchor, depressions in the film due to their suspension being easily seen even without a lens. A sharp knock on the glass causes film-suspended animals to fall through the water to the bottom of the vessel, but as many catch and hang on intervening weeds and even on the sides of the vessel as they fall the threads are probably left trailing outside the closed shell of the alarmed mollusc.

A sprig of water thyme (*Elodea*) in the jar is soon peopled, mostly by dropping surface-film specimens, and suspension soon follows. It seems so strange to see these molluscs in such a hurry to reverse the usual order of things, since in crawling

their incurrent siphons are inferior in position and in suspension superior. After remaining in suspended rest for some time, the animals lower themselves in jerks, as if a certain amount of thread-slime were run out, and then comes a stoppage, until the shells cease to oscillate from the jerky action of the fall, and again more thread is run out and the process repeated until the animals are satisfied with their quarters or the anchoring points give way, and the molluscs fall to the bottom, soon to seek the higher levels. Specimens anchored to the sides of the vessel and which as a rule are tied by web-like arrangements of threads often remain so for days, and when they crawl away leave the sprawling filaments filled with effete particles. The method of attachment here aids the molluscs in breaking free from useless threads. Hence it is reasonable to suppose that mucous filaments are secreted as needed. *Sphærium* cannot crawl up its thread.

When undisturbed the suspended animal has the shell gaping a little and the umbo downwards. From the posterior end of the shell are extended, in each specimen, a pair of united siphons; from the anterior end a cylindrical foot. The longer of the two siphons has its aperture reflexed and ciliated, is usually turned upwards, bends gracefully and slowly about, and organic particles in the water are in a constant rush to it. This is the incurrent or afferent siphon. Somehow many small infusorians—*Vorticellæ* and *Paramecia* especially were watched—when they come within the vortex of the incurrent stream are dashed outside it just as they come within the play of the siphonal cilia. The shorter of the two siphons, which is united for two-thirds its length with the incurrent siphon, is the excurrent or efferent siphon. Its orifice is contracted, ciliated, and in the suspended animals is turned downwards. The decrease in the orifices of the excurrent siphons gives greater ejective force to the outflowing current and their tendency to point downwards and away from the animals aids the gravitation of the ejectamenta. A wonderfully simple but effective method

of preventing much of the waste material of the same animal from coming within the range of the in-flowing currents.

The protrusion of the foot, to which I have already drawn attention, is best seen in those animals which have been suspended for some time; for days together they may remain with their siphons extended to twice the length of their shells, and their foot equally as far, no attempt being made by the animals to use it as an organ of locomotion. The microscope reveals that the foot is ciliated, and that it is assisting the mantle and the incurrent siphon in bringing to their possessor food and air. This adaptation of the foot in these pelecypods as an incurrent ciliated respiratory and alimentative organ is surely an interesting example of those modifications which may occur in animals when conditions are favourable to their development. A dozen or more of these molluscs dropped like pebbles to the bottom of a small beaker, used the foot only to adjust themselves, or to better their position, and then held vertically their extended siphons, the excurrent of course being diverted at their distal extremities. The extension of the foot was not practised in this case, as the molluscs would have only stirred up matter already cast away. We see, then, in the suspended forms the primary use of the organ of locomotion subordinated to another purpose.

The gills are an ever-charming study. The exploration of their ascending and descending lamellæ in the living *Sphærium* is productive of many surprises—light-coloured gill filaments with their chitinous rods, lacunar spaces with blood corpuscles; cilia of many shapes and performing different functions come in succession under the eye of the observer. The stout cilia, which in some forms of pelecypods interlock and bind gill filaments together, here are separate, though playing between each other at places as the fingers of our hands may do, and at other places are wide apart, encircling oval fenestræ. They run down the edges of the filaments in great numbers, until they are replaced by smaller and quicker-moving cilia on

the scalloped margins of the gill-plates. The stout cilia have a finger-like movement, especially such as are scattered in spare groups on the inter-marginal areas of the filaments. Teased-off portions of the gill lamellæ are singularly vital, behaving like so many protozoans; a bit with stout cilia on it is marvellously like *Euplotes*. Isolated ciliated cells are motile so long as life lasts, and then die as is shown by the gradual cessation of ciliary action. This movement may, however, continue for some time; comparatively large pieces teased off gill tissue lived ten hours in a moist cell. This vitality varies; cells of the incurrent siphon lived longer than those of the excurrent siphon in teased-off portions of the same animal. Ciliated foot tissue is comparatively long-lived, but dies somewhat suddenly, and is preceded by a shrinking of the organ to which they belong. The stout cilia of the gills are short-lived, whilst those on the margins are long-lived.

I believe that in the locality where I gather my specimens, the deposition of ova goes on all the year round. I have taken embryos from the brood pouches from March to January. With the exception of a single specimen, examined in December, all my adult examples have yielded young, an interesting confirmation of the herma phroditism of *Sphærium corneum*. There are usually six or seven specimens which can be seen with the naked eye in each brood pouched, and I have taken as many as thirty young from within a single animal. The microscope reveals most minute forms in a state of gradual evolution within the gills. Some of the larger specimens are one-sixteenth the size of the parent, and have shells of a compressed sphenoid shape. At the slightest pressure on the gills of the mother-mollusc these bigger embryos cut their way out and then stop, as if anchored by their byssal threads, and forced separation from the parent requires a pull with the teasing needle.

As the young are found of all sizes in the brood pouches, there is probably in this form a prolonged deposition of ova; in localities where the water is tempered by meteoric changes

this may go on for several months of the year only, in our canal at Armley probably all the year round. The following facts support this view. No gill pouches of *Sphærium corneum* that I have examined possessed young with shells of equal size; the brood pouches could not have retained the number of individuals they actually did possess if these had grown equally, for the gill tissues are merely held by concrescence, and are separated by the larger forms as they grow; the young of *Sphærium* spins a byssus, probably to retain it in the brood pouch whilst the larger forms are passing out; embryos of all sizes are to be found at one time in a brood pouch. These little embryos are most exquisite objects for the microscope—the tiny shells, the crawling ciliated foot, the paired otocysts with the pulsating otoliths at one end of the capsule, each with a little streak, like a crease in a minute air-bubble, the tuft of tinted liver cæcæ, and a heart pulsating at sixty beats per minute. These and many other points might be profitably enlarged upon did space permit, many structures I have passed over for this reason. No animal offers easier study of cell structure. The blood corpuscles are best procured from a teased bit of mantle. The shell is covered with a brown periostracum, which is hairy, the hairs being simple and curved.

Amongst the parasites and commensals, I have noticed the young of the river leech, intestinal worms, *Cyclops*, *Vorticella*, *Stentor*, *Paramæcium*, and *Amæba*, some of the temporarily fixed Protozoa being attached to the base of the foot and others bejewelling the shells.



On *Gibbula incincta* Sowerby.—In looking over the last Journal, I see a description by Mr. Sowerby of a *Gibbula incincta*, from Port Elizabeth. This seems to me to be the same as my *Gibbula tryoni* ('Man. Conch.,' xi., p. 239, pl. 57, figs. 20–21, 1889), although my shells are larger. Perhaps, if you will publish this note, someone may compare Mr. Sowerby's (unfigured) specimens with my figures and description, and so decide the question.—H. A. PILSBRY, Philadelphia, U.S.A.

CLAUSILIA BIDENTATA VAR. CRAVENENSIS.

J. W. TAYLOR, F.L.S.

This interesting and fine variety has long been known to English conchologists under the name of var. *dubia* Drap., and latterly has been included or confounded with the var. *suttoni* Westl. by Dr. Boettger, Westerlund, Clessin, and others.

The *Clausilia dubia* Drap. is especially distinguished from *C. rugosa*, according to its author, by its fewer whorls and smaller size, the figure he gives (pl. iv. f. 10) being only 12 mill. long, and showing, as stated in the description, 9 to 10 whorls. The figure indicates a stouter shell than *C. rugosa*, and, indeed, shows much affinity in general outline to *Pupa secale*.

The true var. *suttoni* was originally published and described in the 'Journal of Conchology' (vol. i., p. 35, Aug. 1874) as var. *schlechtii* Zelebor, and is especially distinguished by a smooth shell, resembling *Clausilia laminata* in its smoothness and transparency, the typical specimens in my possession possessing 11 whorls, and showing no striation under an ordinary lens.

The typical *cravenensis* is especially characteristic of the West Yorkshire Highlands, and has a shell composed of about 13 whorls, and measures 17 mill. long by $3\frac{1}{2}$ broad.

The striation obsolete in true *suttoni* is strongly developed in *cravenensis*, and give the shell a distinctly reticulate appearance. The palatal callus is also strongly developed in *cravenensis*, but is weak and sometimes hardly perceptible in *suttoni*. The inferior lamella is in *cravenensis* distinctly and strongly bifurcate, but this is indistinct in *suttoni*, and when perceptible is more abruptly divaricated. The sub-columellar lamella is distinctly visible at the aperture in *cravenensis*, but not so in *suttoni*.

The name *bidentata* is adopted for the species on the authority of Dr. O. Boettger of Frankfort, the chief authority upon the group, who has satisfied himself that the prior claim of Strom's name is entitled to recognition.

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

PROCEEDINGS.

223rd MEETING, WEDNESDAY, MARCH 14th, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., V.P., in the chair.

Library Purchases announced: (1) Clark's History of British Marine Testaceous Mollusca, 1855; (2) Macgillivray's History of the Molluscoscous Animals of Aberdeen, Banff, and Kincardine, 1843.

Donations to Library announced and thanks voted:

L'Echange Révue Linneenne, Nos. 103 to 106, Juillet to Oct., 1893; Feuille des Jeunes Naturalistes, Nos. 276 to 279 and 281, Octobre to Décembre, 1893, and Janvier and Mars, 1894; British Naturalist, part i, Jan. 1894; and The Naturalist, No. 224, March, 1894—all from the respective editors.

Proceedings of the Royal Society of Queensland, vol. ix., for 1892—93; Proceedings and Transactions of the Nova Scotian Institute of Science, vol. i, part 2, 1891—92; Abstract of Proceedings of Linnean Society of New South Wales, Aug. 30, Sep. 27, Oct. 25, Nov. 29, 1893; Records of the Australian Museum, vol. ii, No. 5, Sep., 1893—all from the respective Societies or Institutions.

Papers by R. F. Scharff on the Geographical Distribution of *Geomaculatus maculosus*, 1893; by John Brazier on the Linnean *Murex corneus* found living on the coast of the Island of New Caledonia, South Pacific Ocean, Jan., 1889; by the late George Gordon on the Probability of a Mollusc (*Bulla striata*), not yet classed in the British Fauna, being found on the Northern Shores of Scotland, 1892; by Robert E. C. Stearns, Ph.D., on Recent Collections of North American Land, Freshwater and Marine Shells received from the U.S. Department of Agriculture, 1894; by Dr. R. Bergh on Eine Neue Gattung von Polyceraden (*Greilada*), 1894; and by A. Merle Norman, D.C.L., on a Month on the Trondhjem Fiord, 1893, in two parts—all from the respective authors.

Isaac Lea's Check List of the Shells of North American Unionidæ, n.d., from Mr. W. Denison Roebuck, F.L.S.

Donations to Collections announced and thanks voted:

A small collection of freshwater shells from Loch Tay, Mid-Perthshire, including *Valvata piscinalis*, *Pisidium pusillum* and v. *obtusale*, *P. milium*, *P. fontinale*, and *Limnæa peregra*, the two first-named being new records for the vice-county; from Mr. Thomas Scott, F.L.S.

A few shells collected in Banffshire, at Inchrory, Glenavon, in June, 1893, including *Limnæa peregra*, *L. auricularia* var. *acuta*, *L. truncatula*, *Ancylus fluviatilis* and var. *albida*, *Bulinus obscurus*, and *Helix arbutorum*, the *Ancylus* and *Limnæa auricularia* being new records for the vice-county; from Mr. Lionel W. Hinxman, of H.M. Geological Survey.

Shells from West Linton, Peeblesshire, including a single young *Pupa cylindracea*, several *Vertigo edentula*, and a few each of *V. substriata*, *Helix fusca*, *Sphærium lacustre* and *Pisidium milium*; from the Rev. Wm. Turner.

Tectura testudinalis from Dunoon, Argyleshire, and *Helix rotundata* from Dumbuck, Dumbartonshire; from Mr. Alexander Shaw.

Various Scottish shells, including *Helix hortensis* and *Limax cinereoniger* (dried) from The Doune, Rothiemurchus, Easternness vice-county; *Pupa cylindracea* and *Clausilia perversa* from the Isle of May, Fifeshire, Aug., 1893; *Succinea putris* from Keilsden near Largo, Fife, 30th Aug., 1893; *Planorbis spirorbis* from Drumshoreland, Linlithgowshire, 13th Sep., 1893; and various species from Luffness Links; all from Mr. Wm. Evans, F.R.S.E.

Dreissensia polymorpha, a couple of valves from the canal, Gamston, Notts.; from Mr. J. W. Taylor, F.L.S.

Candidates Proposed for Membership:

Mr. Kenneth Hurlstone Jones (proposed by Messrs. Robert Standen and Loftus St. George Byne); and Mr. Frederic E. Daniel (proposed by Messrs. A. T. Daniel, M.A., and John W. Taylor, F.L.S.).

Paper Read:

A short paper by Mr. Edgar A. Smith, F.Z.S., entitled 'Note on the Genus *Balea*,' was read, and has since been printed in the Journal of Conchology for July, 1894, p. 389.

Exhibits, etc.:

The Chairman showed a series of the original inimitable drawings of dissections of slugs made during the past ten years by the late Mr. Charles Ashford.

Mr. Henry Crowther, F.R.M.S., then gave a preliminary account of some interesting observations he had recently made in investigating some points in the life-history of *Sphærium corneum* from Leeds and Liverpool canal specimens, promising to give a microscopical demonstration of them at a succeeding meeting.

224th MEETING, WEDNESDAY, APRIL 4th, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., V.P., in the Chair.

Donations to Library announced and thanks voted:

The Naturalist, No. 225, April, 1894; and Feuille des Jeunes Naturalistes, No. 282, Avril, 1894—from the respective Editors.

Donations to Cabinet Fund announced and thanks voted to donors:

Five shillings each from the Rev. Carleton Greene, Mr. Henry Coates, F.R.S.E., and Mr. J. Bassett Dixon.

Donations to Collections announced and thanks voted:

Shells from Corsica, including *Helix aspersa*, *H. lenticula*, and *Clausilia porroi* from Ajaccio; *H. aperta*, *H. pisana*, *H. virgata*, *H. barbara*, and

Linnaea peregra from St. Florent ; *Bythinia tentaculata* and *Ancylus costulatus* from Bastia ; and *H. terrestris* from Corte : all from Dr. R. F. Scharff.

Marine shells from Auckland, New Zealand, viz : *Pleurotoma zealandica*, *Littorina mauritiana*, *Cerithidea bicarinata*, and *Volampyrus cumingianus* ; from Mr. Alexander Shaw.

Various Scottish land and freshwater shells, including *Helix nemoralis* var. *libellula* 00000 and 12345 from Bardowie Loch, Stirlingshire ; 00000, 00300 and (123)(45) from Campbeltown, Kintyre ; *H. hortensis* var. *lutea* 00000, and 12345, *H. arbustorum* var. *flavescens*, and *H. hispida*, from Summerston, Lanarkshire ; *H. nemoralis* var. *carnea* 12345 from Duntocher, Dumbartonshire ; *H. arbustorum*, *H. rotundata*, and *Cochlicopa lubrica* from Tarbert, Loch Fyne ; *H. nemoralis* var. *libellula* 12345, *H. arbustorum*, *H. hispida*, *H. rotundata*, *Hyalinia nitidula*, *H. fulva*, *H. crystallina*, *H. alliaria*, *H. pura*, *Vertigo edentula*, and *Vitrina pellucida* from Stewarton, Ayrshire ; *H. aspersa* from Largs, Ayrshire ; *H. rotundata*, *Hyalinia alliaria*, *H. nitidula*, and *Cochlicopa lubrica* from Castlecary, Stirlingshire, 30th Aug., 1890 ; *Balea perversa*, *Clausilia perversa*, and *Helix granulata* (*sericea*) from Port Bannatyne, Bute ; and *H. rotundata* and *Hyalinia nitidula* from Lamlash, Isle of Arran ; all from Mr. Alex. Shaw.

A number of Irish Land and Freshwater Shells, including *Helix nemoralis* var. *rubella* 00345 from Rathmullen, co. Donegal, Feb., 1894 ; *H. rufescens*, *H. nemoralis* var. *carnea* 12345, 00345, 00300, 00000, var. *rubella* 00300, and var. *libellula* 12345 and (123)(45), *H. aspersa*, *Hyalinia nitidula*, *Clausilia perversa*, *Cochlicopa lubrica*, and *Pupa cylindracea* from Rostrevor, co. Down, July, 1892 ; *Helix rufescens*, *H. rotundata*, *Hyalinia pura* and *H. cellaria* from Holywood, co. Down, July, 1892 ; and *Pupa cylindracea* from Omagh, co. Tyrone, Feb., 1894 ; all from Mr. Alexander Shaw.

New Members Elected :

Mr. Frederic E. Daniel, M.R.C.S., L.R.C.P., 141, Abbey Road, Barrow-in-Furness.

Mr. Kenneth Hurlstone Jones, St. Bride's Rectory, Old Trafford, Manchester.

Candidate Proposed for Membership :

Mr. Wm. Evans, F.R.S.E. (proposed by Mr. Thomas Scott, F.L.S., and Mr. W. Denison Roebuck, F.L.S.).

Papers Read :

A note by Mr. Lionel E. Adams, B.A., hon. treas. C.S., on ' *Hydrobia (Paludestrina) jenkinsi* at Lewes ' was read, and has since been published in the ' J. of C. ' for July, 1894, p. 390.

A paper, by Mr. J. T. Marshall, entitled " Additions to ' British Conchology ' " was read, and has since been published in the ' J. of C. ' for April and July, 1894, pp. 379—385.

A paper by Mr. Henry Crowther, F.R.M.S., on the ' Biology of *Sphærium corneum* ' was read, and is published in the present number of the ' J. of C. ' pp. 417—421.

Exhibits :

On behalf of Mr. C. H. Morris, were exhibited in illustration of Mr. Adams' note, examples of *Hydrobia jenkinsi* from a stream at Lewes, eight miles away from the sea, where they were collected in March, 1894.

On behalf of Mr. Robert Cairns were shown examples of *Helix hortensis* taken by Mr. Alletsee near Douglas, Isle of Man, July, 1893; *Vertigo substriata* from Whitestrand, two miles north of Peel; and *Pupa anglica* from three Manx localities.

Mr. Henry Crowther, F.R.M.S., exhibited a series of shells he had put together for the Leeds Museum, showing the influence of climate on the coloration of Molluscan Shells.

Mr. Crowther then demonstrated under the microscope various points in the anatomy and life history of *Sphærium corneum*, in illustration of his paper.

225th MEETING, WEDNESDAY, MAY 2ND, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., Vice-president, in the Chair.

Donations to Library announced and thanks voted :

The Naturalist, No. 226, May, 1894; and Feuille des Jeunes Naturalistes, No. 283, Mai, 1894; from the respective Editors.

Donations to the Collections announced and thanks voted :

Shells from Gloucestershire for the typical series displayed permanently in the Museum at Leeds, including *Helix hortensis* var. *lutea* (12)345, 00000, 12345, var. *albida* 00000, and var. *lutea* 12345, and (12)345 *arenicola*, *H. nemoralis* vars. *rubella* 00000 and 00300, *castanea* 00000 and 00300, and *libellula* 00000 and 00300, *H. rufescens* with vars. *rubens*, *albocincta* and *alba*, *H. lapicida*, *H. aculeata*, *Cyclostoma*, *Zua*, *Clausilia perversa*, *Bulinus obscurus*, *Cl. rolpheii*, *Vitrina*, *H. rupestris*, and *H. pulchella* from Cooper's Hill, near Cheltenham; and *Cl. laminata* from near Gloucester; all from Mr. A. G. Stubbs.

Various species of land shells from Porto Santo, Madeira; from Mr. W. E. Scharff.

New Member elected :

Mr. Wm. Evans, F.R.S.E., F.R.P.S.E., 18a, Morningside Park, Edinburgh.

Exhibits :

Mr. W. E. Scharff exhibited a series of land shells from Puerto Santo, Madeiran Archipelago, including *Helix polymorpha* in three varieties, *H. punctulata*, *H. lenticula*, *H. pamperscula*, *H. abjecta*, *H. albersii*, *H. phlebophora*, *H. consors*, *H. pisana*, *H. acuta*, and *Clausilia delostoma*, also semi-fossilized examples of *H. lowei*, and specimens of seven or eight other species not yet determined. Mr. Scharff gave an interesting account of his researches on the island.

Letter Read :

A letter addressed to the Chairman by Signor Augusto Statuti, of Rome, was read, in which he asked for specimens of the common *Cardium edule*—both the typical British form and some of its more interesting varia-

tions—and offering many different forms of the same species which are living in southern seas, as he is now engaged in a study of this common species.

226th MEETING (ANNUAL), SATURDAY, 9th JUNE, 1894.

Held at Manchester.

[Full Report, with Annual Report, List of Members, &c., will appear in the January number].

227th MEETING, WEDNESDAY, AUGUST 22nd, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., president, in the chair.

Donations to Library announced and thanks voted :

Archivos do Museu Nacional do Rio de Janeiro, vol. viii, 1892 ; Journal and Proceedings of the Royal Society of New South Wales, vol. xxvii, 1893 ; Proceedings of the Linnean Society of New South Wales, 2nd series, vol. viii, parts 2 and 3, 1893—all from the respective societies and institutions.

Feuille des Jeunes Naturalistes, Nos. 284—285, Juin and Juillet, 1894 ; and The Naturalist, Nos. 227 to 229, June to August, 1894—from the respective editors.

Reprints of papers by Dr. R. E. C. Stearns on the Shells of the Tres Marias and other localities along the shores of Lower California and the Gulf of California, 1894 ; Charles A. White, Notes on the Invertebrate Fauna of the Dakota Formation, with Descriptions of new Molluscan Forms, 1894 ; and W. H. Dall, a Monograph of the genus *Gnathodon* Gray (*Rangia* Desmoulins) 1894—all from the respective authors.

Donation to Photograph Album announced and thanks voted :

Cabinet portrait of the Rev. Carleton Greene, from himself.

Donations to Collections announced and thanks voted :

A series of marine mollusca from the coast of Dorsetshire, including *Tapes pullastra* var. *perforans*, *Venerupis irus*, *Rissoa striata*, *R. costata*, *Odostomia lactea*, *Adeorbis subcarinatus*, *Tectura virginea*, *Saxicava rugosa*, *Cardium exiguum*, *Littorina rudis*, *Rissoa parva*, *Nassa incrassata*, *Littorina neritoides*, *Trochus zizyphinus*, *Purpura lapillus*, *Natica catena*, and *Patella vulgata*, all from Swanage ; *Modiolaria marmorata*, *Lamellaria perspicua*, *Axinus flexuosus*, *Akera bullata*, *Philine aperta*, *Fissurella græca*, *Loripes lacteus*, *Corbula gibba*, *Sepia officinalis*, *Rissoa membranacea*, *Solen vagina*, *Ostrea edulis*, *Mytilus adriaticus*, *Lacuna pallidula*, *L. puteolus*, *Emarginula rosea*, *Donax vittatus*, *D. politus*, *Turritella terebra*, *Pleurotoma rufa*, *Trophon truncatus*, *Helcion pellucidum*, and *Lacuna crassior*, all from Studland Bay ; *Dentalium tarentinum*, *Lacuna divaricata*, and *Tellina fabula*, all from both Studland Bay and Swanage ; *Trochus umbilicatus* from Chapman's Pool, Dorsetshire ; *Hydrobia ulvæ* and *Littorina rudis* from Poole Harbour ; and *Cyprina islandica* from near Parkstone, Dorset—all from Mr. J. Eddowes Cooper

Candidate Proposed for Membership :

Mr. Peter Lawson (proposed by Messrs. John W. Taylor, F.L.S., and W. Denison Roebuck, F.L.S.).

Papers Read :

A note by Mr. Edgar A. Smith, F.Z.S., and one by Dr. E. von Martens, C.M.Z.S., both on the 'Nomenclature of *Dreissensia polymorpha*,' were read ; Dr. Martens' note is printed in the current number, pp. 415—6.

A paper by Mr. Kenneth Hurlstone Jones on 'Molluscan Albinism and the Tendency to the Phenomenon in 1893,' was read, and will be printed in the Journal of Conchology for January, 1895.

A note by Mr. H. A. Pilsbry 'On *Gibbula incincta* Sowerby' was read, and is printed in the current number, p. 421.

A paper by Mr. J. T. Marshall entitled 'Alterations in "British Conchology"' was read, and will be published in the Journal of Conchology for 1895.

A short paper by the Rev. J. W. Horsley, M.A., entitled 'Notes on Mollusca at Canterbury' was read, and is printed in the current number, p. 434.

A paper by Mr. C. H. Morris on '*Hydrobia (Paludestrina) jenkinsi* at Lewes,' was read, and is printed in the current number, p. 414.

A note by Mr. John W. Taylor, F.L.S., on '*Succinea oblonga* in Jersey,' was read, and is printed in the current number, p. 414.

A paper by Messrs. James Cosmo Melvill, M.A., F.L.S., and Robert Standen, entitled 'Notes on a Collection of Marine Shells, with List of Species, from the Loyalty Islands, made by the Rev. James Hadfield,' was read, and will be printed in a future number of the Journal of Conchology.

A note by Mr. J. E. Cooper on 'Dorsetshire Marine Shells,' was read, and is printed in the current number, pp. 435—436. It was illustrated by the series of examples presented to the society for its collection.

Exhibits :

Various species of land and freshwater shells from Gloucester were shown on behalf of Mr. A. G. Stubbs.

228th MEETING, WEDNESDAY, SEPTEMBER 26th, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., president, in the chair.

Donations to Library announced and thanks voted :

Feuille des Jeunes Naturalistes, Nos. 186—187, Août and Septembre, 1894 ; and The Naturalist, No. 230, September, 1894—from the respective editors.

Proceedings of the Royal Physical Society of Edinburgh, sess. 1893—94, vol. xii, part ii, 1894—from the Society.

Donations to Cabinet Fund announced and thanks voted : Five shillings from Mr. J. C. Eccles.

New Member Elected :

Mr. Peter Lawson, 11, The Broadway, Walham Green, London, S.W.

Exhibits :

On behalf of Mr. A. G. Stubbs were shown a further series of Gloucestershire land and freshwater shells, including *Helix arbustorum* from near Hempstead, Haresfield, and Minsterworth, and var. *fuscescens* (*maïmorata*) and *alpestris* from Haresfield ; *H. nemoralis* var. *libellula* 00045, 000(45), 00(345), 0003(45), 10345, 02345, and 00345, *H. aculeata*, *H. hispida* var. *albida*, *Hyalinia nitidula*, *H. cellaria*, *Arion ater*, *Limax maximus*, *H. aspersa*, *H. nemoralis* vars. *libellula* 12345, (12345), *rubella* 12345, 00045, (12345), 00300 *minor*, (12345) *minor*, and 00300 *conica*, *castanea* 00000, 12345, 00345, and 00000 *minor*, *H. hortensis* var. *lutea* (12345), (12)345, 1(23)(45), 10345, 12345 with semi-translucent brownish bands, 00000 *minor*, 10345 *minor*, 12345 *minor*, *H. rotundata*, *H. concinna* var. *subrufa*, *H. nemoralis* var. *carnea* 10345, (12)3(45), 1(23)(45), var. *libellula* 1(23)(45), *H. arbustorum* var. *flavescens* and *H. nemoralis* var. *libellula* 00045 *conica*, all from near Gloucester, 1894 ; *H. itala* (*ericetorum*), *Balca*, and *Vertigo edentula* from Haresfield Beacon, 1894 ; *H. itala* var. *alba*, *H. caperata*, *H. virgata* and varieties from canal banks near Gloucester, 1894 ; *Pupa cylindracea* from Upton near Gloucester, *Carychium* from Matson near Gloucester, *Succinea elegans* and var. *albida*, and *Helix virgata* var., from Hempstead near Gloucester, 1894 ; *Limax marginatus*, *Agriolimax agrestis* from Parkend Road near Gloucester, 17th May, 1894 ; *Clausilia laminata* var. *albida* from Cranham Woods near Gloucester, 1894 ; *Bulimus montanus*, *Pupa secale* and *Hyalinia crystallina* from Cranham near Gloucester, *Helix concinna* var. *hispidosa* from Haresfield near Gloucester, 1894 ; *H. nemoralis* var. *libellula* 12345 *major*, 1(23)45 *major* and 123(45) *major* from Bristol Road, Gloucester ; *Succinea putris* and var. *albida* from the banks of the Severn, Gloucester ; and *Helix caperata* var. *ornata* from Birdlip Hill near Gloucester.

229th MEETING, WEDNESDAY, OCTOBER 3rd, 1894.

Held at the Philosophical Hall, Leeds.

Chair occupied successively by Mr. Henry Crowther, F.R.M.S., hon. librarian, and Mr. John W. Taylor, F.L.S., president.

Donations to Library announced and thanks voted :

The Naturalist, No. 231, Oct., 1894 ; and Feuille des Jeunes Naturalistes, No. 288, Oct., 1894—from the respective editors.

Report of the Trustees of the Australian Museum for the year 1893—from the Trustees.

Exhibits :

On behalf of Mr. A. G. Stubbs, a further series of shells from the neighbourhood of Gloucester were exhibited.

On behalf of Mr. G. A. Frank Knight were shown a number of Scottish land and freshwater shells, including *Unio margaritifera* from the river Spey, Invernessshire ; *Helix virgata* and var. *subdeleta*, and *H. acuta* and var. *articulata* from the ballast hills at Troon, Ayrshire ; *H. rufescens* from

Bearsden, county Dumbarton; *Ancylus fluviatilis* and *Limnæa peregra* and var. *ovata* from Bull Loch, Bute; *Valvata piscinalis*, *Planorbis albus*, and *Pl. contortus* from Dougalston Loch, Stirlingshire; *Zua*, and very small *Clausilia perversa* from Onich, Loch Linnhe; *Ancylus fluviatilis* from Righ Water, Onich, Loch Linnhe; *Sph. cornucum* from Loch of Skene, Aberdeenshire; *Helix rotundata* from Loch Ridden Islands (Kyles of Bute), Strachur (Loch Fyne), Kilpatrick Hills, Dumbartonshire, and Baldernock, Stirlingshire; *Vitrina* from Bearsden and Kilpatrick, Dumbartonshire, and Strachur, Argyllshire; *Zua* from Kilpatrick, Dumbartonshire; *Limnæa peregra* var. *ovata* from Craigton, Milngavie, Dumbartonshire; *Pisidium pusillum* and *Limnæa peregra* var. *minor* from Iorsa Water, Isle of Arran; *Pisidium nitidum* from Loch Morlich, 1046 feet altitude, Invernessshire; *Limnæa peregra* from Lochinver, Sutherlandshire; *L. peregra* var. *ovata*, and *Helix aspersa* from Auchenlochan, Kyles of Bute; *Succinea elegans* from Collieston, Aberdeenshire; *Hyalinia cellaria* and *Pupa cylindracea* from Loch Ridden Islands, Kyles of Bute; *Helix aspersa* var. aff. *unilulata* (but not characteristic), from Aberdeen; *Limnæa peregra* from Little Machrie Water, Isle of Arran; *Helix arbustorum* from Arrochar, Loch Long, at a height of 700 feet up Ben Chrois; *H. hortensis* var. *lutea* 00000 from Cruden Bay, Aberdeenshire; *Limnæa peregra* and *Ancylus fluviatilis* from the Pass of Brander, Loch Awe; *L. peregra* var. *ovata* and *L. auricularia* var. *acuta* from the Gatehouse of Fleet, Kirkcudbrightshire; *L. peregra* var. *ovata* from Nethy Bridge, Speyside, and from Loch Meldaloch, Tighnabruaich, Kyles of Bute, Argyllshire; *Hyalinia alliaris* and *H. nitidula* from Loch Awe islands, Argyllshire; *Helix aspersa* from Helensburgh, Dumbartonshire; and *Succinea putris* from Arrochar, River Loin; and several foreign shells from various localities.

On behalf of Mr. Arthur Mayfield, was shown living *Amalia gagates* from North Heigham near Norwich.

230th MEETING, WEDNESDAY, NOVEMBER 7th, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., president, in the chair.

Donations to Library announced and thanks voted:

The Naturalist, No. 232, Nov., 1894; and Feuille des Jeunes Naturalistes, No. 289, Nov., 1894—from the respective editors.

Journal and Proceedings of the Hamilton Association, session 1893-94, No. 10, 1894—from the Association.

Candidate Proposed for Membership:

Mr. William Charles Smith (proposed by Messrs. Peter Lawson and John W. Taylor, F.L.S.).

Exhibits:

On behalf of Mr. C. H. Morris were shown numerous translucently-banded white examples of *Helix virgata* from Friston near Eastbourne, East Sussex, collected Nov. 1st, 1894.

The President showed *Hydrobia jenkinsi* from the canal, Shortheath, Staffordshire; *Helix carthusiana* sent by Mr. Adams from Sandwich, Kent; and *H. obvoluta* from Crabbe Wood near Winchester.

231st MEETING, WEDNESDAY, DECEMBER 5th, 1894.

Held at the Philosophical Hall, Leeds.

Mr. John W. Taylor, F.L.S., president, in the chair.

Library Purchase announced : Part I of Mr. Taylor's Monograph of the Land and Freshwater Mollusca of the British Isles.

Donations to Library announced and thanks voted :

The Naturalist, No. 233, December, 1894 ; and Feuille des Jeunes Naturalistes, No. 290, Décembre, 1894—from the respective editors.

Proceedings of the Royal Society of Queensland, 1892—94, vol. x., and index to vol vii., viii., and ix.—from the society.

New Member elected :

Mr. William Charles Smith, Vanston House, 7, Vanston Place, Walham Green, Fulham, London, S.W.

Candidate Proposed for Membership :

Mr. Bernard Arnold (proposed by Messrs. John W. Taylor, F.L.S., and John A. Hargreaves).

Exhibits :

On behalf of Mr. Arthur Mayfield were shown examples of *Arion minimus* found on a tree stump under dead leaves at Caistor and Dunston near Norwich.

Mr. A. G. Stubbs was present, and showed *Vitrina* from Hempstead, *Helix rotundata* v. *alba* from Whaddon, *H. caepata* from Haresfield Beacon, and varieties of the last-named and of *H. virgata* from the canal banks, all near Gloucester, 1894 ; also a great number of species and varieties of land and freshwater mollusca found within ten miles of Gloucester, including a number of scalariform and other monstrosities.

Mr. Henry Crowther, F.R.M.S., showed on behalf of Mrs. Crowther, a fine example of *Pectunculus glycymeris* with pilose covering, and a very perfect example of *Isocardia cor*, both from Helston River, Cornwall.

The President showed living examples of *Hyalinia glabra* from Newlay ; *Helix virgata* from Laugharne ; *Clausilia rugosa* from Debdale, near Mansfield, Notts. ; var. *suttoni* from Starborton in Wharfedale ; and var. *schlechtii* from Wark, Northumberland.

He also showed a number of shells collected in the vice-county of South Perth with Clackmannan, all near Bridge of Allan, Blairlogie, Abbey Craig, and Lake of Menteith, by Mr. G. W. McDougall, of Stirling, including *Helix nemoralis* var. *olivacea* 00000 and *libellula* 12345, *H. hortensis* var. *lutea* 12345, *H. arbutorum*, *H. concinna* var. *albocincta*, *H. rotundata*, *H. hispida*, *Hyalinia cellaria*, *H. alliaria*, *H. nitidula*, *Physa fontinalis*, *Bulinus hypnorum*, *Succinea elegans*, *Vitrina*, *Ancylus fluviatilis*, *Limnaea peregra* and var. *lacustris*, *L. palustris*, *Sphaerium corneum*, *Pisidium fontinale*, *Planorbis spirorbis*, *Pl. albus*, *Pl. parvus*, *Pl. contortus*, *Valvata piscinalis*, *Zua*, *Clausilia perversa*, *Hyalinia radiatula*, *H. crystallina*, *H. fulva*, *H. pura*, *Helix pulchella*, *H. aculeata*, *Pisidium pusillum*, *P. milium*, *Carychium*, *Vertigo edentula*, *V. pusilla*, and *V. pygmaea*.—W.D.R.

BIBLIOGRAPHY.

THE NEW MONOGRAPH.

J. W. Taylor.—A Monograph of the Land and Freshwater Mollusca of the British Isles, Part I. (Leeds, pp. 64, 1 plate, 138 illustrations in text). Price 6/-, or by subscription 5/-, free by post, 5/3.

A GREAT deal has happened to some of us since this monograph was first publicly proposed in 1883, and it is much to be deplored that some of those who took considerable interest in the work have not lived to see its publication. However, Mr. Scudder was twenty years preparing his great treatise on the Butterflies of New England, so perhaps we ought to be very grateful for the appearance of Part I. of the Monograph in a little more than ten years from the publicly announced commencement of its preparation.

Those who have taken part in the controversies of the day, cannot fail to look with interest for the publication of those parts of the monograph treating of the various species and varieties in detail. Here will be found the results of ten years' deliberation on hundreds of knotty points concerning which great diversities of opinion prevail, and the conclusions arrived at cannot fail to be interesting, whether we agree with them or not. The present part, however, does not stir up the fires of controversy to any great extent, dealing almost entirely with fundamental and well-known facts.

If the practised conchologist is possibly a little impatient at finding more interesting matters temporarily shelved for what he regards as common-places, the amateur will assuredly be grateful; and as the chief value of the book, perhaps, will be its power of attracting new students and stimulating beginners, it cannot be said that the space thus given up is wasted. It is undoubtedly one of the greatest misfortunes that science has to contend with, that great and serious obstacles are commonly placed in the way of the beginner. Many naturalists continually forget that all are not so well-informed as themselves; and drift into a style which is simply bewildering to any but the old hands. This is most conspicuously illustrated, perhaps, in synopses of families, genera, and species, which though seeming satisfactory to their authors, are frequently even misleading to beginners.

It is therefore satisfactory to welcome a book which begins at the beginning; and at the risk of thrashing a considerable amount of old straw, aims to be almost entirely self-explanatory, like a sort of Euclid of Conchology. Most especially to be commended is the abundance of illustration, whereby space in description may be saved, and everything made much easier to understand than would be possible by the most carefully chosen words. It is more especially this feature in Mr. W. G. Binney's *Manual of American Land Shells* which makes that work so admirable a guide to the North American species, combined as it is with an extremely lucid text.

The list of terms used in describing, while not so full as that given by Dr. Westerlund in his *Fundamenta Malacologica* (1892, p. 119), is probably sufficient for ordinary purposes. In order to test this, I gave the work to a student who had not any special knowledge of mollusca, and requested her to describe, with its help, a *Cyclotus* from Jamaica. The

result was as follows:—‘Coiled dextrally; depressed, paucispiral, transversely striate, sulcate, umbilicated, subcarinate periphery, rounded aperture, peristome continuous.’ The colour and size were purposely omitted. I should hardly have applied the term paucispiral to the shell, but to do so was natural enough in the light of the figures on p. 26. Westerlund goes into this matter a little more fully, distinguishing between the gradually and rapidly enlarging whorls separately from the question as to their number. Westerlund also explains the meaning of ‘penultimate whorl,’ which perplexed my student.

A few other points in the work deserve mention. The printing is most excellent, and free from errors; but the binding of my copy is rather unsatisfactory. The plate is very good, the three varieties of *H. aspersa* being especially excellent; but I do not know why it was necessary to go to Férussac for a *Limax maximus*.

Credit is given to collectors of all specimens figured; but it seems rather unnecessary, in addition to this, to inform us to what learned society the said collectors happen to belong!

I feel tempted to offer some criticisms of the remarks on varieties, but refrain, as these are not concluded in the present part, and on previous occasions I have said my say on this subject pretty fully. There is, however, one point that should be emphasised. On p. 61 reference is made to the palpable band-variations in *Helix*, which may be less important than more subtle variations in form or character. It has been too little noticed, that while a species may present similar variations in two localities, the average appearance or *facies* of long series from these localities may be different. These differences are often subtle, and only noticed when comparing numerous specimens all together, yet they are certainly worthy of serious attention.

So far Part I. It may be said in conclusion that everyone who is interested in British Mollusca ought certainly to have the book, and judge for himself of its contents. To such persons it will be a necessity.

T. D. A. COCKERELL.

Habitat of *Unio pictorum* v. *platyrhinchoidea* Dupuy.—On page 64 of Taylor’s ‘Monograph of British Land and Freshwater Mollusca,’ there is a reference to the occurrence of this variety in Hethersett Lake, with the remark that possibly there was some peculiar feature in the lake which would assist in accounting for the existence of this running-water form in that locality. Hethersett Lake is about 200 yards long and about 50 yards wide. A small stream flows in at one end, a stream quite three times as large flows out at the other end; this difference in volume is accounted for by the fact that there are numerous springs in the lake itself, which can be felt when bathing, and which show themselves distinctly when the lake is frozen. Perhaps this peculiarity accounts for the occurrence of this variety.—A. G. STUBBS, November 11th, 1894.

NOTES ON MOLLUSCA AT CANTERBURY.

BY THE REV. J. W. HORSLEY, M.A.

(Read before the Conchological Society, 22nd August, 1894).

DURING a short visit to Canterbury I found *Helix cartusiana* var. *minor* and one specimen of var. *alba* at Barham Downs ; also a colony of *H. hortensis* 00300 at Stuppington. Why this variety should be so rare in *H. hortensis* and so common in *H. nemoralis* always puzzles me. Wherever I have found it, it prevails over any other variety of *H. hortensis* in the same hedge. At Upper Hardres I found plentifully, on a somewhat barren hill-side, *H. virgata* var. *alba* and var. *hyalozonata*. Something in the nature of the soil or its vegetation was unfavourable to the development of pigment, as the var. *albescens* was still more plentiful, and the type and the var. *submaritima* comparatively rare ; and also *H. ericetorum* and *H. cantiana* were mainly white or whitish, though *H. caperata* (the only other *Helix* I noticed in the field) was well marked and coloured. This was the first time I had taken var. *alba*, and I may note the difference between it and var. *albescens* :—(1). When the animal is extricated the shell is so pure white as to deserve the name of *candidissima*, whereas that of *albescens* has always a yellowish tinge. (2.) The tip is pure white and well defined—that of *albescens* less strong and always reddish. (3). The shell of *alba* is more transparent and the body of the animal, I think, blacker, the result being that *alba* on the grass has a distinctly slate or bluish tint, so much so that my young children at once distinguished between what they called the white (*albescens*) and the blue (*alba*) shells, and brought me only the latter. And when *alba* is banded (which it frequently is, white *albescens* is never) the dark body seen through the transparent bands seems definitely bluish-grey, not at all like the black or brown bands of the typical *Helix virgata*.

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NOTES OF DORSETSHIRE MARINE SHELLS.

By JAMES E. COOPER.

(Read before the Conchological Society, 22nd August, 1894).

IN the 'Journal of Conchology,' vol. vi., page 110, the Rev. Carleton Greene published an interesting list of the shells of Studland Bay, Dorset. A recent visit to Swanage has enabled me to submit the following additions to that list for the shore from Poole Head to Studland:—

Ostrea edulis L.

Mytilus adriaticus (Lamk.).

Modiolaria marmorata Forbes.

Loripes lacteus L.

Axinus flexuosus (Mont.).

Cyprina islandica (L.).

Tellina fabula Grön.

Donax vittatus (Da Costa).

D. politus Poli.

Solen vagina L.

Corbula gibba Olivi.

Dentalium tarentinum Lamk.

Emarginula rosea Bell.

Fissurella græca L.

Helcion pellucidum (L.).

Lacuna crassior Mont.

L. puteolus Turton.

L. divaricata Fabr.

L. pallidula Da Costa.

Rissoa membranacea (Ad.).

Turritella terebra (L.).

Natica catena (Da Costa).

Lamellaria perspicua L.

Trophon truncatus Ström.

Pleurotoma rufa Mont.

Akera bullata Müll.

Philine aperta (L.).

Hydrobia ulvæ (Penn.).

Sepia officinalis L.

At or near Swanage the following species also occur :—

Cardium exiguum Gmel.

Tapes pullastra var. *perforans* (Mont.).

Savicava rugosa (L.).

Venerupis irus L.

Gastrochæna dubia Penn.

Thracia distorta Mont.

Pholas parva Penn.

Tectura virginea (Müll.).

Patella vulgata L.

Trochus zizyphinus L.

Littorina neritoides L.

L. rudis Maton.

Rissoa parva (Da Costa).

R. striata Ad.

R. costata Ad.

Skenea planorbis Fabr.

Odostomia lactea (L.).

Adeorbis subcarinatus Mont.

Nassa incrassata (Ström.).

Purpura lapillus (L.).

And at Chapman's Pool,

Trochus umbilicatus (Mont.).

This list is probably far from complete, as it only represents the results of shore-hunting. Dredging and shore-work after stormy weather would no doubt largely increase the list.

93, SOUTHWOOD LANE, HIGHGATE,
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PUBLISHED UNDER THE DIRECTION OF THE COUNCIL.

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Pompilius L.	1—3		v. squamulosus Ar.	1,—		turbinat Lam.(min.)	2—3	
umbilicatus L.	12—18		*v. Tarentinus Lm.	0,50-1		Typhis.		
Janthina.			v. triquetter Oliv.	3,—		fistulosus Phil.	1—2	
casta Rve. def.	2,—		eurypteron Rve.	10—25		*tetrapteris Bron . . .	0,50-1,50	
*communis L.	0,50-1		fenestratus Chm.	3—5		Trophon.		
*exigua Lm.	0,30-40		festivus Hinds	1—3		Angasi Crosse	2—3	
fragilis Lam.	2—3		gibba Pse	1-1,50		Barvicensis Johnst.	1,—	
*globosa Sw.	1,—		gibbosus Lam.	3—4		candelabrum Rve.	2—5	
trochoidea Cuv.	1—1,50		haustellum L.	0,50-1,50		*clathratus L.	0,50-1	
umbilicata D'orb.	0,50-80		hexagonus Lam.	2—3		*v. Gunneri Low.	1-1,50	
Carinaria.			imperialis Sws.	2—4		crassilabrum Gray . . .	1—2	
*mediterranea Desh.	2—4		lingua-vervecinaCh	3—4		*craticulatus Fbr. . . .	1—3	
Murex.			lyratus Ads.	1—2		v. Fabricci Beck	5,—	
acanthopterusLam.	3—5		MacgillivrayiDohrn	5,—		cretaceus Rve.	2—3	
adunco-spinosusBk	1—2		Martinianus Rv.	1—2		Geversianus Pall. . . .	2—5	
adustus Lm.	0,50-1		maurus Brod.	2—5		Kobelti v. Maltz.	5,—	
v. fuscus Dkr.	2—3		messorius Sow.	3,—		laciniiatus Martyn. . . .	10—15	
v. rufus Lm.	3,—		microphyllus Lam.	2—5		Philippianus Dkr. . . .	2—4	
affinis Rve.	3—4		miliaris Gm.	2—3		recurvus Koch.	2—3	
alveatus Kien.	0,50-0,80		monachus Crosse	2—3		*truncatus Ström. . . .	0,20-50	
angularis Lam.	3—5		nigrescens Sow.	2,—		v. Jeffreyssi Val.	1,—	
anguliferus Lm.	0,50-1,50		nigrispinosus Rv.	2—3		vaginatus Chr.	1—2	
v. erythraeus Fisch	5,—		ngritus Phil.	1—4		Urosalpinx.		
v. ferrugo Wood	2—3		Nuttalli Conr.	1—3		Floridana Conr.	3,—	
v. ponderosus Chm	2—4		occa Sow.	3—5		tritoniformis Blvll.	3,—	
Banksi Sow.	3—5		palmarosae Lm.	4—6		Pyrula.		
bicolor Val.	1—2		palmiferus Sow.	1—3		angulata Lm.	0,50-80	
*brandaris L.	0,50-1		pinnatus Wood	1—3		bispinosa Phil.	5—8	
*v. coronatus Riss.	0,80-1,50		plificiferus Sow.	4—6		v. Martiniana Phil.	5,—	
brassica Lm.	3—6		pomum Gm.	0,50-1,50		citrina Lam.	1,—	
breviculus Sow.	1—2		Poulsoni Carp.	1—2		cochlidium L.	2—3	
brevifrons Lm.	1—3		princeps Brod.	5—8		colossea Lm.	3—10	
brevispina Lm.	1-1,20		radix Gm.	1—6		corona Gm.	2—5	
Cailletti Pet.	2—5		ramosus L.	0,50-150,		elongata Lam.	3—5	
calcitrapa Lm.	0,80-2		rarisipina Lam.	1—3		galeodes Lm.	0,50-80	
Capitii Bern.	3—5		rectirostris Sow.	2—3		melongena L.	0,50—1	
capucinus Chm.	0,50-1,20		regius Wood	1—3		morio L.	1—2	
clavus Kien.	10—30		rosarium Chm.	2—5		pallida Brod	0,80-1,20	
*corallinus Sc.	0,20-30		rubiginosus Rve.	3—4		pallida BrodetSow.	1—2	
*v. aciculatus Lm.	0,20-30		rufus Lam.	1—3		v. anceps Ads.	2,—	
cornutus L.	1—3		salebrosus King.	1,50-3		paradisiaca Mart. . . .	0,30-80	
corrugatus Sow.	2—3		Salleanus Ads(min.)	1,—		v. nodosa Lm.	0,50—1	
*cristatus Broc.	0,40-60		saxatilis L.	1—3		patula Brod	0,50-1,50	
*v. Blainvillei Payr.	0,40-50		scolopax Dill.	2—4		pugilina Born.	0,50—1	
v. senegalensis v.M.	0,50		scorpio L.	2—5		squamosa Lam.	1,50	
Cumingi Ads.	3—4		Senegalensis Gm. . . .	1—3		Ternatana Gm.	1—2	
cyclostoma Sow.	0,50-80		v. calcar Kien.	3—5		tuba Gm.	1—3	
Dunkeri Krss.	0,40-50		similis Sow.	3—5		Busycon.		
*Edwardsi Payr.	0,30-40		sinensis Rve.	1—3		canaliculatum Lm. . . .	1—3	
v. nux Rve.	0,30-40		Talienwahanens.Cs	1—2		perversum L.	1—3	
elongatusLm.nonR.	2—4		tenuispina Lm.	2—6		pyrum Dillw.	1—3	
emarginata Sow.	2—4		ternispina Lm.	1—2		spiratum L.	1—3	
			torrefactus Sow.	2—3				

	Mk.		Mk.		Mk.
Neptunea.		v. ringens Rve.	0,50	Columbarium.	
*alternata Phil.	1—2	v. Tissoti Pet.	1,—	pagoda Less.	30,—
*antiqua L.	0,50—1	cingula Rve.	1,—	Pleurotoma.	
f. maxima	3,—	distorta Gray	1—2	abbreviata Rv.	0,80—1
arthritica Val. vera!	2—5	elegans Gray	1—2	australis Ch.	2—5
Behringi Midd.		*Orbigny Payr.	0,20	Babylonia L.	1—2
e. operculum	20,—	v. assimilis Rve.	0,50	Barclayana A. Ad	0,40—60
castanea Mörch	5,—	picta Sc.	0,50	bilineata Rve.	1,—
contraria L. subfoss.	3—5	Proteus Rv.	0,30—60	bijubata Rv.	0,40—60
*despecta L.	1—3	v. subrubiginosus S.	1,—	bimarginata Lm.	2—3
*v. carinata Penn.	2—4	puncticulata Dkr.	1,—	carbonaria Rv.	1—1,50
v. elongata Verkr.	5,—	sanguinolenta Ducl.	1—1,50	cincta Lm.	0,40—60
plicata Ads.	6,—	tafon Ads.	1,—	cingulifera Lm.	0,60—1
plicosa Mke.	3—5	v. variegata Gray	0,50—80	crenulata Lam.	0,50—1
*Turtoni Bean	4—10	tinetus Contr.	1,50	crenularis Lam.	2—4
Streptosiphon.		Tranquebarica Gm.	1,—	diadema Kien.	2—3
afer Gmel.	2 3	undosa L.	0,30—50	digitalis Rve.	0,50—1
Cumingi Jonas	40,—	unicolor Angas	1,—	discors Sow.	1,—
Tudicla.		Metula.		exasperata Rv.	1—1,50
spirillus L.	2—3	marmorata Rv.	0,60—1	flavidula Lm.	0,50—1,50
Sypho.		Euthria.		Garnonsii Rv.	1—1,50
*curtus Jeffr.	3—5	*cornea L.	0,20—80	grandis Gray	5,—
glaber Verkr.	3—4	dira Rv.	0,40—50	Griffithii Gray	3—5
*gracilis F. et H.	1—2	lineata Mart.	0,50—1	Javana L.	3—5
Jeffreysianus Fisch.	10,—	plumbea Phil.	1,—	lanceolata Rve.	1—2
*islandicus Chm.	5—10	v. viridula Dkr.	0,50—1	leucotropis Rv.	1—1,50
Kroyeri Moell.	10,—	Fusus.		lineata Dkr.	1,—
latericus Moell.	2,—	aureus Rve.	1—2	luctuosa Sow.	1,—
propinguis Ald.	4—6	Boettgeri v. Maltz.	1—3	maculosa Hinds.	0,50—1
pygmaeus Gld.	1—1,50	colosseus Rve.	30,—	marmorata Lm.	1—3
Stimpsoni Mörch	5—10	colus L.	1—3	mitraeformis Kien.	1—3
*striatus Rv.	2—3	*craticulatus Broc.	0,40—1	muricata Lm.	2—3
ventricosa Gray	2—3	distans Lm.	2—4	nodifera Lm.	1—3
Syphonalia.		Dupetitthouarsi K.	3—5	ornata D'Orb.	0,50—1
cassidariaeform Rv.	1—2	elegans Rv.	2—3	sacerdos Rv.	1—2
v. conspersa Lischke	3,—	forceps Perry	1—3	*similis Rve.	6—8
v. ornata Ads.	3,—	Hanleyi Ang.	5,—	tigrina Lm.	0,50—1
fusoides Rve.	4—6	inconstans Lischke	2—3	tuberculata Gray	1—1,50
Kelleti Forb. defect	2,—	latecostatus Perry	2—3	varicosa Rve.	1—2
pastinaca Rve.	6—10	lividus Phil.	1—2	virgo Lm.	5—6
signum Rve.	3,—	longicauda Bory	5—8	zebra Lm.	0,30—40
spadicea Rve.	6—8	longissimus Gmel.	10,—	Bela.	
varicosa Chm.	5,—	mexicanus Rve.	1—2	*pyramidalis Str.	0,30—60
zelandica Quoy	6—8	multicarinatus Lam.	3—5	*septangularis Mtg.	0,30—50
Pisania.		nicobaricus Chm.	3—5	*simplex Midd.	0,50—2
cingilla Rve.	0,50	novae Holland. Rve.	3,—	*turricula Mtg.	0,20—30
crenilabrum Ads.	1,—	nodoso-plicat. Dkr.	3,—	*v. exarata Möll.	0,20—30
fasciculata Rve.	1,50	Paeteli Dkr.	2—3	*v. nobilis Möll.	0,50—1
francolina Lam.	1—2	perplexus Ads.	3,—	*v. rosea Sars	0,30—40
gracilis Rve.	1,—	polygonoides Lm.	1—1,50	*violacea Migh.	0,20—40
*maculosa Lm.	0,20	probosciferus Lm.	3—8	Pusionella.	
picta Rv.	0,50—1	pyrulatus Rve.	2—3	aculeiformis Lam.	3—5
pusio L.	0,30—60	*rostratus Oliv.	0,50—1	Mileti Pet.	3—5
Clavella.		subquadratus Sow.	2,—	subgranulata Pet.	1—4
serotina Hinds.	2—5	*Syracusanus L.	0,30—1	vulpina Born.	2—4
Pollia.		tuberculatus Lm.	2—4	Wallaysi Pet.	3—5
angicostata Rve.	1,—	undatus Gmel.	3—5	Cionella.	
Coromandeliana Lm	0,30—50	Lachesis.		buccinoides Lm.	1—3
v. lautus Rve.	1,—	minima Mtg.	0,20	caffra Smith	2—3

	Mk.		Mk.		Mk.
Kraussi	3-5	Klenei Ads.	1-2	Ranella.	
rosaria Rve.	1-3	Kobelti v. Maltz. . .	5,-	affinis Brod.	0,50-1
semicostata Kien. . .	1-3	labiosus Wood. . . .	0,50-1	albivaricosa L. . . .	0,50-1
subventricosa Sm. . .	3-5	v. Strangei Ads. . . .	3,-	anceps Lm.	0,50-1
taxus Chm.	3-4	lampas L.	1-4	argus Gmel.	2-3
Defrancia		lotorium L.	0,50-1,50	f. gigantea	5,-
*Cordieri Payr. . . .	0,30-50	maculosus Gm.	2-5	Bergeri Ads.	2,-
*v. cancellata Sow. .	1,-	magellanicus Ch. . . .	3-5	bitubercularis Lm. .	0,50-1
*v. histrio Jan. . . .	1,-	Martensianus Wood . .	1-2	bufonia Lm.	0,50-1,50
rugosa Mighl.	0,50	moritinctus Rv. . . .	0,50-1,50	v. siphonata Rve. . .	0,50-1
v. eurculis Nev. . . .	1,-	nitidulus Sow.	1,-	v. venustula Rve. . .	1-2
*Leufroyi Mich. . . .	0,30-80	nobilis Contr.	3-8	caelata Brod.	1-2
v. carnosula Jeffr. .	1,50	v. Sequenzae Ar. . . .		californica Hinds. . .	2-4
v. coralligena Mtg. . .	1,-	et Ben.	6-25	candisata Ch. rare	6,-
Daphnella.		nodiferus Lm.	1-5	caudata Say.	1,-
decorata Ads.	1,-	olearius L.	1,50	crassa Dilw.	0,50-1
*nebula Mtg.	0,30-50	obscurus Rve.	2-3	cruentata Sow. . . .	1-1,50
*v. Ginaniana Phil. .	0,40	Oregonensis Say. . . .	1-4	crumena Lm.	0,50-1,50
*taeniata Desh. . . .	0,40-50	*parthenopeus Sal. . .	2-3	dubia Pet.	1-2
Triton.		parvus Ads.	1,-	foliata Brod.	1-3
acuminatus Mont. . . .	1-2	Pfeifferianus Rv. . . .	1-2,50	Garettii Semp.	0,60-80
aegrotus Rve.	1,-	pilearis L.	0,30-1	*gigantea Lm.	2-4
africanus Ads.	6-8	pyrum L.	0,80-1,50	granifera Lm.	0,30-60
aquatilis Rv.	0,50-1,50	Quoyi Rv.	0,40-50	gyrina L.	0,30-50
australis Lm.	1,50-4	reticosus Ads.	0,50-1	hastula Rve.	1,-
bacillum Rve.	1,50	*reticulatus Blvll. . .	0,30-40	laevigata L. (Aspa)	10,-
Bassi Ang.	3-5	v. lanceolatus Mke. . .	1-1,50	leucostoma Lm. . . .	0,60-1,50
Bednalli Braz.	2-3	retusus Lm.	1,-	livida Rve.	1-3
bracteatus Hinds. . .	0,50-1	rubecula L.	0,30-50	margaritula Dsh. . .	0,50-1
caudatus Gmel.	1-1,50	rudis Brod.	0,50-1	muriciformis Brod. .	1-3
" Wood	3,-	saccostoma Rve.	3-5	nana Sow.	3-5
Ceylonensis Sow. . . .	2-3	Sauliae Rve.	5-8	nitida Brod.	1,50
Chemnitz Gray	1-3	scaber King.	0,50-1	Paulucciana T. C. . .	2-3
chlorostomus Lm. . . .	0,30-1	sculptilis Rve.	1-1,50	perca Perry.	3-5
cingulatus Lm.	1-2	siphonatus Rve.	1-2	f. gigantea	5,-
claudestinus Ch. . . .	1-1,50	Spengleri Ch.	1-3	ponderosa Rv.	1-1,50
clavator Ch.	1-3	subdistortus Lam. . . .	3-4	pusilla Brod.	0,50-1
comptus Sow. rare	10-15	tenuiliratus Lischk. . .	3,-	v. concinna Dkr. . . .	1,50
*corrugatus Lm. . . .	1-2	testaceus Mörch. . . .	2-3	pustulosa Rve.	3,-
crispus Rve.	1-1,50	tessellatus Rve.	1-1,50	ranelloides Rve. . . .	6-10
*cutaceus L.	0,50-1,50	thersites Rve.	2-3	rhodostoma Sow. . . .	1,50
v. intermedius Brch. .	2,-	tigrinus Brod.	10-15	rosea Rve.	1,50
v. tuberculatus Riss. .	2,-	v. Ranzani Bianc. . . .	30,-	rugosa Sow.	3-4
cynocephalus Lm. . . .	0,50-1,50	tortuosus Rve.	2-3	siphonata Rv.	0,50-1
decapitatus Rve. . . .	0,50-1	tranquebaricus Lm. . .	1-3	spinosa Lm.	1-2
deollata Sow.	1-2	tripus Chm.	2-3	tuberculata Brod. . .	0,30-80
distortus Schub. . . .	1-2	truncatus Hinds. . . .	1-1,50	tuberosissima Rve. .	1-2
doliarius L.	0,50-1	tuberosus Lm.	0,20-50	ventricosa Brod. . . .	1-2
eburneus Rve.	3,-	vestitus Hinds.	2-3	vexillum Sow.	2-4
exilis Rve.	2-3	variegatus Lm.	2-10	Buccinum.	
eximius Rve.	1-2	vespaceus Lam.	1-2	Adalaidense Cr.ver.	1-1,50
femolaris L.	1-2	Persona.		*Amalia Verkr.	3-5
fieoides Rv.	1-2	anus L.	1-2	" extra c. opercul.	8,-
fusiformis Kien. . . .	1-2	cancellina Roiss. . . .	1-2	anglicanum Mart. . .	1-2
gemmatas Rve.	0,30-50	constricta Brod. . . .	4-6	alveolata Kien. . . .	0,50
gracilis Rve.	1-1,50	decipiens Rve.	3-5	*Belcheri Rve. rare	15,-
intermedius Pse. . . .	2-3	reticulata L.	3-4	corrugatum Rve. . . .	1,50
		ridens Rve.	1-3	*carinatum Dkr. rare	10,-
		Smithi v. Maltz	5-8	costata Quoy.	0,50-1

	Mk.		Mk.		Mk.
*Donovani Gr. rare	8—10	diluta Krss.	1,50	*Cuvieri Payr. . . .	0,20-30
filiceum Crosse . .	1—2	globulosa Kien. . .	0,50—2	dentifera Ads. . . .	0,30-50
*Finnmarkianum V.	0,50-1,50	gradata Desh. . . .	2—4	dispar A. Ad.	0,40
*v. pellucidum Verk.	3,—	Grayi Rve.	2—3	echinata Ads.	0,50
*fragile Verk. . . .	1—3	laevigata Mart. . .	2—3	elegans Kien.	1,—
*groenlandicum Ch.	0,50—1	malabarica Hanl. .	0,50—1	exilis Powis.	0,50
*v. cyaneum Müll. . .	1—2	polita Lm.	0,30-50	fasciata Lm.	0,20-30
*v. inflatum Aur. . .	3,—	pura Melv.	1—3	festiva Powis. . . .	0,30-40
*glaciale L.	1—3	tenuis Gray.	2—3	filosa Gray.	0,30-40
*v. polare Gray. . .	5,—	vittata L.	0,30-50	v. algida Rve.	0,50
*Humphreysianum B	3—5	v. livida Rve. extra	1—2	v. bicallosa Sm. . . .	1,—
Huttoni Kob.	2,—	Phos.		v. graphitera B.ver.	1,—
*hythrophanum Hank	6,—	Grateloupiana Pet.	1—2	v. marmorea Ads.	1,—
*inexhaustum Verk.	3—5	ligatus Ads.	1,50	v. picta Dkr.	0,50
lagenarium Lm. . . .	0,30-50	pallidus Powis. . .	0,50—1	fossata Gld.	0,50—1
limbosa Lm.	1—2	senticosus L.	0,50—1	gemmaata Lam. . . .	0,30-50
lineare Rve.	2,—	v. fasciatus Rve. .	2,—	v. conoidalis D.ver.	0,50
lineolata Quoy. . . .	1—2	textilinus Mörch. .	0,50—1	gaudiosa Hds.	0,50
maculatum Mart. . .	1—1,50	textum Gm.	0,50—1	Gayi Kien.	0,30
*Moerchianum Fisch	6,—	v. rhodostomus M.	2,—	gemmaifera Ads.	0,50
*Moelleri Rve. . . .	3—5	Cyllene.		glans L.	0,40-80
Paulucciana T. C.	10,—	lyrata Lm.	1—1,50	v. elegans Kiener . .	1,—
Perryi Jay.	3—5	plumbea Sow. . . .	2,—	v. susturalis Lm. . .	0,50—1
*pictum Verk.	1—3	Desmoulea.		globosa Quoy.	0,30
porcatum Gm.	0,50—1	pinguis A. Ad. c. op.	3—5	*gibbosula L.	0,30-50
*Sarsi Pfeffer	5,—	retusa Lm.	1—2	v. circumcincta Ad.	0,50
*scalariformis B.ver.	5,—	Nassa.		grana Lam.	0,30-50
*tenuae Gray.	1—3	acuticosta Monstr.	0,40-50	granifera Kien. . . .	0,30-40
testudinea Mart. . .	1,—	albescens Dkr. . . .	0,30-40	gaillardoti Fisch. . .	1,—
*Totteni Stimps. . .	2—3	ambigua Mtg.	0,30	hirta Kien.	0,30-50
* „ extra c. opercul.	5,—	arcularia L.	0,20-30	v. bifaria Baird. . . .	1,—
*undatum L.	0,50—1	v. pulla L.	0,30-40	hispidia Ads.	0,30-50
f. grandis Verk. . .	3—5	v. Rumphii Desh. . .	0,30-40	horrida Dkr.	0,40-50
*v. acumiatum Brod.	1—2	Bronni Phl.	0,30-40	*incrassata Müll. . .	0,20
*v. americanum Verk	1—3	callosa Ads.	0,50	v. coccinella Lam.	0,50
*v. imperiale Rve. . .	6—8	v. callospira Ads.	0,50	v. senegalensis v.M.	1,—
*v. pelagicum Sars.	1—5	canaliculata Lm. .	0,30	Jonasi Dkr.	0,50
*v. planum Rve. . . .	2—3	candens Hds.	0,50	Japonica Ads.	0,50
*v. pyramidale Rve.	3—5	Capensis Dkr. . . .	0,20-30	Kieneri Desh.	0,30-50
*v. sinistrorsum Brd.	3—5	clathrata Kien. . .	0,20-40	Kraussiana Dkr. . . .	0,40-60
*v. undulatum Moell.	3—5	v. globosa Gray . . .	0,40	Kochiana Dkr.	1,—
*v. Vadsoensis Verk.	2—3	coccinea Ads.	1,—	lentiginosa Ads. . . .	0,50—1
*v. zetlandicum Forb.	3,—	compta Ads.	0,50	leptospira Ads. . . .	1,—
Zeyheri Krss.	1,—	concinna Powis. . .	0,40-50	*limata Ch.	0,50—2
Truncaria.		conoidalis Dsh. . .	0,40-50	limnaeiformis Dkr.	1,—
modesta Powis. . . .	0,80-1,20	*cornicula Oliv. . .	0,20	lineata Lam.	1,—
Northia.		*v. Camieli Payr. . .	0,50	livescens Phil.	0,30-50
pristis Desh.	3—8	*v. Gallandiana Fsch.	0,50	luteostoma Kien. . . .	0,30-50
Bullia.		*v. plicata Oliv. . .	0,50	maculata Ads.	0,50
annulata Lm.	1—2	coronata Lm.	0,20-30	marginulata Lm. . . .	0,50
armata Gray.	1—3	corrugata Ads. . . .	1,—	v. Isabellei D'Orb . .	1,—
Belangeri Kien. . . .	0,50—1	*costulata Ren. . . .	0,30	mangeloides Rve. . .	1,—
callosa Wood.	1—2	v. crassa Koch. . . .	0,50	mendica Gld.	0,30-50
Cumingiana Dkr. . .	1—2	v. unifasciata Brus.	0,50	v. Cooperi Torb. . . .	1,—
digitalis Meusch. . .	0,50—1	crenulata Brug. . . .	0,30-50	miga Ad.	0,30-50
v. achatina Gray. . .	0,50—1	crenata Hinds. . . .	1,—	v. obliqueplicata D.	1,—
v. rhodostoma Gray.	1—1,50	v. margaritifera Dk.	0,30-50	mitralis Ads.	1,—
v. semiusta Rve. . .	2,—	curta Gld.	0,40-50	momile Kien.	0,30-50
				v. Jacksoniana Qu.	0,80

	Mk.		Mk.		Mk.
mucronata Ads. . .	0,50	*variabilis Phil. . .	0,20	v. plicata Lm. . .	1,—
multigranosa Dkr. .	0,50	v. Ferrussaci Payr. .	1,—	*lapillus L. . . .	0,20-30
Mülleri v. Maltz. . .	1,50	*varicosa Turt. . .	0,30-40	v. attenuata Rve. .	
Murati Sm. n. sp. . .	1,—	verrucosa Ads. . .	0,30-40	(species)	1,—
muricata Quoy. . .	0,30-40	versicolor	0,50—1	*v. bizonalis Lm. . .	0,50
*mutabilis L. . . .	0,20-30	vibex Say. . . .	0,50	*v. canaliculata Duc. .	1,—
*v. albida Monter. . .	1,—	virescens Phil. . .	0,30-50	v. Conradi Nutt. . .	1,—
*v. ebenacea „ . .	1,—	Woodwardi Forb. .	0,50	v. lima Mart. . . .	1,—
*v. maculata „ . .	1,—	Eburnea.		v. rupestris Val. . .	1,—
nodifera Powis. . .	0,30-50	areolata Lm. extra	1—3	v. squamulosa Gr. .	1,—
*obsoleta Say . . .	0,20-30	ambulacrum Sow. .	2—3	luteostoma Ch. . .	0,50—1
olivacea Brug. extr.	0,50—1	Borneensis Sow. . .	5,—	v. capensis Pet. spec.	1,—
pachychila v. Maltz. .	2,—	Ceylancia Lm. . . .	1—2	mancinella L. extra	0,40—1
pagoda Rve. . . .	1—2	Japonica Rv. . . .	1—2	v. aegrota Rv. spec.	2,—
papillosa L. . . .	0,40-60	lutosa Lm. . . .	1—3	macrostoma Küst. .	1—1,50
f. gigantea	1,50	spirata Lm. . . .	1—1,50	melones Ducl. extra	0,30—1
pauperata Lm. . . .	0,30-40	Cyclops.		neritoidea L. . . .	0,50—1
paupera Gld. . . .	0,50	Kamieschi Ch. . . .	0,50	nigrocincta Dk. rar.	2,—
pedicularis Lm. . .	1,—	*neriteus L. . . .	0,20	nux Rve. . . .	0,50
plicosa Dkr. . . .	1,—	*pellucidus Riss. . .	0,20	patula L. . . .	0,50—1
polygonata Lam. . .	1,—	Chorus.		persica L. extra . .	0,50—2
pulchella Ads. . . .	0,30-40	Belcheri Hinds. . .	15,—	pica Blv. „ . . .	0,30—1
ravida Ads. . . .	0,40-60	xanthostomus Brd. .		planospira Lm. . . .	1—2
reticulata L. . . .	0,20	c. operculum	2—5	Quoyi Rve. . . .	1,—
*v. curta Mont. . . .	0,50	Purpura.		Rudolphi Ch. . . .	0,50—1
*v. depicta „ . . .	1,—	aperta Blvll. . . .	0,50-1,50	rugosa Born. . . .	1—1,50
v. hepatica Powis .		armigera Ch. . . .	0,50-1,50	rustica Lm. . . .	1,50
Ind. orient. . . .	0,50—1	biserialis Bl. . . .	0,50-80	Savignyi Desh. . . .	1,—
*v. nitida Jeffer. . .	0,50	bitubercularis Lm. .	0,30-50	saxicola Val. . . .	0,50-80
*vulgata Gmel. . . .	0,50	Blainvillei Desh. ex.	1—2	v. canaliculata Duc. .	1,—
rufula Kien. . . .	0,50-80	bufo Lm. . . .	0,40-80	v. emarginata Desh. .	1,50
Samoensis Dkr. . .	0,30-40	v. callosa Lm. . . .	1—1,50	v. fuscata Forb. . .	1,—
semigranosa Dkr. . .	0,50	Callaënsis Gray. . .	1,—	v. ostrina Gould. . .	1,—
semiplicata Ads. . .	0,50	Carolensis Rve. . .	0,80—1	scobina Quoy. . . .	0,50—1
semistriata Brocch. .	0,50	cataracta Chm. . . .	0,50—1	serta Brug. . . .	0,50—1
sinusigera Ads. . .	1,—	chocolate Ducl. . .	0,50—1	speciosa Val. . . .	0,50—1
v. siquijorensis Ads. .	0,50	cingulata L. . . .	0,50—1	spiralis Rve. . . .	1—2
speciosa Ads. . . .	0,50—1	columellaris Lm. . .	0,50—1	succinata Mrt. extr.	0,50-1,50
spirata Ads. vera		consul Chm. . . .	0,50-1,50	v. squamosa Lam. .	
non glans	1,—	coronata Lm. . . .	0,50	(species)	0,50—1
Stimpsoni Ads. . . .	0,50	v. callifera Lm. . . .	0,50	taenita Powis. rare	3,—
stolata Gm. . . .	1,—	crispata Ch. . . .	1—2	textilosa Lm. . . .	0,50—1
v. ornata Kien. . . .	1,50	cruentata Gm. . . .	1,50	tumulosa Rve. . . .	0,50—1
Sturmi Phil. . . .	1,—	deltoidea Lm. . . .	0,50—1	v. Bronni Dkr. spec.	0,50—1
subspinosa Lm. . . .	0,30-40	echinata Bl. extra	0,50—1	v. clavigera Kst. „ .	0,30-50
succincta Ads. . . .	0,30-50	echinulata Lm. extr.	0,50—1	undata Lm. . . .	0,50—1
Sutoris Dkr. . . .	1,50	Fischeri Pet. . . .	1—1,50	vexilla Lam. . . .	1,—
taenia Gm. . . .	0,30	Floridana Conr. . .	0,50—1		
taeniolata Phil. . .	0,50	Forbesi Dkr. . . .	0,50-80	Ricinula.	
tegula Rve. . . .	0,30-40	*haemastoma L. . .	0,30-60	anaxares Ducl. . . .	0,50-80
Thersites Brug. . .	0,20-30	f. gigantea Rv. extr.	2,—	aspersa Lam. . . .	0,50
v. bimaculosa Ads. .	0,50	v. bicostalis Lm. „ .	0,50-1,50	biconica Blvll. . . .	1,—
v. Iru Martz. . . .	0,50	v. fasciata R. (spec.)	0,50—1	v. bicatenata Rve. .	
tiarula Kien. . . .	0,30-50	haustrium Mrt. extr.	0,50-1,50	(species)	0,50-80
v. delirata Ads. . .	0,50	hippocastanum L. .	0,30-50	cancellata Quoy. . .	0,50-80
Tinnei Mar. . . .	0,50	v. aculeata Desh. . .	0,40-60	v. fenestrata Blvll. .	0,80—1
tritoniformis Kien. .	0,50—1	v. alveolata Rve. . .	0,50—1	chaidea Ducl. . . .	0,50—1
*trivittata Say. . . .	0,30-40	v. intermedia Kien. .	1,50	clathrata Lm. . . .	1—1,50
unicolorata Kien. . .	0,40-60			v. miticula Lm. . .	2,—

	Mk.		Mk.		Mk.
concatenata Bl.	0,40-60	tectum Gray.	1—2	affinis Marr.	0,30-50
concentria Rvl.	1—1,50	thiarella Lm.	1—2	anazora Ducl.	0,50
digitata Lm.	0,50—1	trigona Rve.	1,—	baetica Carp.	0,30-40
v. lobata Desh.	1—1,50	Rapana.		columellaris Sow.	0,20-40
elongata Bl.	0,40-50	angulifera Lam.	1—2	consobrina Lischk.	1,—
fiscellum Ch.	0,30-50	bezoar L.	1—2	dama Mawe.	0,30-40
v. fusco-nigra Dkr.	1,—	v. Tomasiana Cross.	2—3	dealbata Rve.	0,50-80
ferruginosa Rve.	0,50	" extra, grande		diadochus Ads.	0,50
fragum Blvll.	0,50-80	c. operculum	5,—	cuneata Marr.	0,50
granulata Ducl.	0,50-80	bulbosa Sol.	1—2	elongata Marr.	0,50
horrida Lm.	0,50—1	" extra c. op.	3,—	exigua Marr.	0,30-50
hystrix L.	1—1,50	coronata Lm.	0,40-80	Fortunei Ads.	1—1,50
v. Reeveana Crosse	2,50	squamosa Lm.	0,50-1,50	fulgida Rve.	1,50
jodostoma Les.	0,80—1	Latiaxis.		gracilis Brod.	0,30-50
lineata Rve.	1,—	Mawae Gray	35,—	guldingi Rve.	0,50
margariticola Brod	0,50	Idolae Jonas rare	45,—	jaspidea Gmel. non	
mauritiana Rve.	0,30-50	Coralliophila.		Ducl.	0,20-30
morus Lm.	0,30-40	bulbiformis Conr.	3,—	inconspicua Ads.	0,30
v. alba Mart.	1,—	costata Ducl.	1,50	lineolata Gray.	0,50
v. aspera Lam.	1,—	costularis Blv.	1—1,50	micans Ducl.	0,50—1
v. striata Pse.	1,—	exarata Pse.	1—1,50	millepunctata Ducl.	1,—
musiva Kien.	1,—	galea Ch.	1—1,50	monilifera Rve.	0,30
mutica Lam.	0,50—1	*lamellosa Jan.	2,—	mutica Say.	0,20
nodulosa Ads.	1,—	madreporina Ad.	0,60—1	myriadina Ducl.	0,30
ochrostoma Blvll.	0,30-50	neritoidea Ch.	0,50—1	nana Lam.-micans	
ricinus L.	0,30-50	squamulosa Rv.	0,60—1	Dillw. non Ducl.	1,—
v. albolabris Blvll.	0,30-50	Pseudomurex.		nivea Gmel.	0,20
" extra	1,—	Meyendorffi Calc.	5,—	v. eburnea Lm.	0,30
speciosa Dkr.	2,—	Melapium.		v. oryza Lam.	0,30
spectrum Rv.	0,30-50	lineatum Lam.	8—10	nitens Dkr.	0,50
trifasciata Rve.	1,—	Rapa.		nympha Ads.	0,30-50
tuberculatum Blv.	0,30-50	papyracea Lm.	1—3	panniculata Ducl.	1,50
undata Chm.	1,—	rapiformis Born. ext.	1—5	paxillus Rve.	1,50
v. albovaria Küst.	1,50	Leptoconchus.		puelchana D'Orb.	1,—
Monoceros.		Cumingi Desh.	3,—	pulchella Ducl.	1—1,50
brevidentatum Gr.	0,40-60	Lamarecki Desh.	0,50-1,50	pusilla Marr.	0,30
calcar Mart. extra	1—2	Robilliardi Leon.	0,50-1,50	priperita "	1,50
v. acuminatum Sow.	1—2	stritatus Rüpp.	0,50-1,50	rosalina Ducl.	0,50
v. citrinum Sow.	1,—	Magilus.		semistriata Gray.	0,20
v. costatum Sow.	0,50—1	antiguus Mft.	2—6	strigata Rve.	0,30-40
cingulatum Lm.	0,50—1	Olivancillaria.		tergina Ducl.	0,20-30
crassilabrum Lm.	0,60—1	aquatilis "	0,50—1	undatella Lm.	0,20-30
engonatum Conr.	1—2	Brasilienis Ch.	1—2	Verreauxi Ducl.	0,20-30
glabratum Lam.	0,50-1,50	gibbosa Born.	0,30-80	versicolor Marr.	0,50—1
lappiloides Conr.	1—1,50	vesica Gmel.	0,50—1	volutella Lam. extra	0,20-30
lugubre Sow.	1—2	Aragonia.		zanoeta Ducl.	1,—
v. cymatum Sow.	1,—	acuminata Lm.	0,50—1	zenospira Ducl.	1—1,50
muricatum Brod.	2—3	contortuplicata Rve	1—2	ziczac Ducl.	0,20
tuberculatum Gray.		hiatula Gm.	0,50—1	Oliva.	
extra	3—5	intricata Marr.	2,—	angulata Lm.	1—4
Concholepas.		nebulosa Lam.	1—1,50	araneosa Lm.	0,50-80
Peruviana Lm.	0,50—2	pallida Sws.	1,—	v. fuscata Marr.	1,—
Cuma.		subulata Lam. extr.	1—1,50	v. Julietta Dcl. spec	1—2
angulifera Ducl.	1—2	testacea Lm.	0,50—1	v. polpasta Dcl. "	1—1,50
carinifera Lm.	0,50—1	Olivella.		v. venulata Lam. "	0,30-50
gradata Jon.	1—2	attenuata Rve.	0,30-40	Australis Ducl.	1—1,50
imperialis Blvll.	1—3			avellana Lam.	0,50—1
kiosquiformis Ducl.	0,50—1			biplicata Sow.	0,30-50

	Mk.		Mk.		Mk.
Broderipi Ducl.	1,—	similis Marr.	2,—	*lignaria L.	0,50—1
bulbiformis Ducl.	0,60-80	splendidula Sow.	1—1,50	papillosa Sow.	6,—
bulbosa Bolt.	1—1,50	stellata Ducl.	2,—	ponderosa Jon.	8—10
Bülowi Sow. n. Sp.	2—3	tesselata Lm.	0,20-40	trapezium L.	0,50—1
carneola Gm.	0,30-50	textilina Lm.	0,50-1,50	tulipa L.	0,50—2
v. athenia Ducl. spec	0,50	v. olympiadin Del.		Latirus.	
Caroliniana Ducl.	1,50	extra	2—3	Bairstowi Sow.	2,—
castanea Lam.	1—1,50	v. pica Lam.	1—2	Brasilianus D'Orb.	3,—
Cumingi Rve.	2—3	tigrina Lm.	0,30-50	brevicaudatus Rv.	1—2
cylindrica Marr.	1,—	v. holosericea Marr.	1,—	Caledonicus Pet.	2—3
Duclosi Rve.	0,60—1	tremulina Lm.	0,50—1	castaneus Rve.	2,—
elegans Lam.	0,40-50	tricolor Lm.	0,20-40	f. gigantea extra	5,—
episcopalis Lm.	0,30-60	undata	1,—	ceratus Gray.	1—2
eridona Ducl.	1,50	v. bicincta Lm.	1,—	chlorostoma Sow.	1—2
erythrostoma Lm.	0,30-80	v. ventricosa Sol.	1,—	cinguliferus Lam.	1—2
v. pallida Ducl.	2,—	Dipsaccus.		craticulatus L.	0,50—1
v. ponderosa Del. ext	0,50—1	glabratus L.	0,50-1,50	elegans Dkr.	0,50—1
flaveola Ducl.	0,50—1	Lienardi Bern. extr.	8—10	filosus Schub. def.	1,—
flammulata Lm.	0,20-60	niveus Sws.	3—5	incarnatus Desh.	0,80—1
floralia Ducl.	0,20-30	Amalda.		v. elegans Dkr.	1,50
funeralis Lm.	0,30-60	lineata Kien.	2,—	infundibulum Gm.	1—2
v. dactyliola Ducl.		marginata Lm.	3—5	Knorri Desh.	2,—
species	1,—	obesa Sow.	1—2	nassa Gm.	0,50—1
fusiformis Lm.	0,40—1	oblonga Sow.	1—1,50	nassatulus Lm.	0,40-80
glandiformis Marr.	1,—	Tankervillei Sws. ex	15,—	Newcombi Ads.	1—1,50
guttata Lm.	0,40-60	Ancilla.		nodatus Martyn.	1—2
v. cruenta Lam.	2,—	achatina Kien. rare	3,—	ocellatus Gm.	0,50-60
v. emicator Mörch.	1,—	acuminata Sow.	0,60—1	Philberti Recl.	1,50
v. maculata Ducl.	1,—	albisulcata Sow. ext	3,—	pictus Rve.	1—3
graphica Marr.	1—1,50	candida Lam.	1—2	polygonus Gm.	1—1,50
harpularia Lam.	3,—	Australis Sow.	3,—	prismaticus Mart.	1—3
inflata Lm.	0,20-30	v. depressa Sow.	3,—	smaragdulus L.	0,50—1
v. alba Lam.	0,40-50	castanea Sow.	2,—	spinosus Mart.	0,50-80
v. undata Lam.	0,30	cinnamomea Lam.	2,—	turritus L.	0,50—1
irisans Lm.	0,50—1	crassa Sow.	3,—	ustulatus Rve.	1,—
ispidula L.	0,10-30	fulva Sws.	0,30-60	Turbinella.	
v. tigridella Ducl.	0,50	lineolata Ads.	1—1,50	gravis Dillw. extra	5,—
Kaleontina Ducl.	1—1,50	mamillata Hinds. ex.	3—5	ovoidea Kien.	2—5
Keenei Marr.	1,50	marmorata Rve.	2,—	pyrum L.	1—2
Lecoquiana Ducl.	1—1,50	Mauritiana Sow.	0,30-60	Scolymus (Vasum).	
lepida Ducl.	0,30-50	v. alba	0,50	armata Brod. extra	1—2
litterata Lm.	0,20-60	Montrouzieri Souv.		caestum Brod. "	3—5
maura Lm.	0,50-1,50	extra	3—5	capitellus L.	0,60-1,50
murina Mke.	1,—	obtusa Sws.	1,—	cassidiforme Rv.	2—5
mustellina Lam.	0,30-50	f. gigantea extra	5,—	ceramicus L.	1—2
oriola Lm.	0,40-60	rubiginosa Sow. ext.	8—10	" extra	4,—
ornata Marr.	2,—	torosa Meusch. "	1—1,50	cornigerus Lm.	0,50—1
Peruviana Lm.	0,30-80	v. alba Lam. "	1—2	muricatus Born.	1—3
v. coniformis Ph.	0,50-60	tricolor Gray.	1,—	v. pugillarlis Lam.	4—6
pieta Rve.	0,50	variegata Sow.	3,—	rhinoceros Lm.	0,80-1,50
porphyria L. extra	1—3	ventricosa Lam. ext.	1—2	" extra	3,—
reticularis Lm.	0,30-50	Fasciolaria.		scolymus Gm.	4—8
v. candida Lam.	0,50	distans Lm.	1—2	tubiferum Ant.	5,—
v. graphica Marr.	1,—	filamentosa Lm.	1—1,50	Voluta.	
v. hepatica Lam.	0,50	v. ferruginea Lam.	2—3	Aethiopica L.	2—3
rufopieta Wkff.	2,—	fusiformis Val.	5,—	v. regium Schub. ex.	10,—
sanguinolenta Lm.	0,30-50	inermis Jon.	0,80—1	angulata Sws.	3—6
scripta Lam.	0,60—1				
sidelia Ducl.	2,—				

	Mk.		Mk.		Mk.
bullata Sws. defect	5,—	adusta Lm. extra	1—3	v. buccinata Quoy.	3,—
" perfect	30—40	alauda Soul.	0,50—1	Graeffei Cross.	0,80—1
cassidula Rve. extra	8—10	ambigua Sw.	1—1,50	granatina Lam.	1—2
cisium Mke	1—3	v. fulva Sws.	1—2	granulosa Lm.	0,50—1
colocyntthis Ch.	8—10	arenosa Lm.	0,40—50	Gruneri Rv.	2,—
Cumingi Brod.	8—10	astricta Rve.	1—2	hybrida Kien.	2—3
Delessertiana Pet.	6—7	aurantia Gm.	0,50—1	intermedia Kien.	1—2
deliciosa Montrz.	4—6	aureolata Rv.	0,80—1	Isabella Sw. defect	3,—
Deshayesi Rv.	4—8	v. affinis Rve.	1,50	latruncularia Rve.	1,50
diadema Lm.	2—3	Barbadensis Gm.	0,50—1	lens Wood.	1—3
ducalis Lam.	3—5	v. picta Rve.	1—1,50	litterata Lm.	0,40—50
Ellioti Sow. extra	3—5	brumalis Rv.	0,80—1	v. maculosa Rve.	1,—
flavicans Gm.	10—20	brunnea Pse.	0,50—1	melongena Lm. ext.	3—4
fusiformis Sw. extr.	8,—	cadaverosa Rv.	0,40—50	muriculata Lm.	0,80—1
fulgetrum Sws.	30,—	caffra L.	1—2	nebulosa Sws.	2—3
harpa Barn.	8—10	cardinalis Gron. ext.	1—2	nucleola Lam.	0,50—80
Hebraea L. extra	5,—	chrysalis Rv.	0,50—1	nucea Gron.	1—2
imperialis Lm.	5—10	chrysostoma Sw.	1—2	obesa Rve.	2,50
Indica Gm.	1—3	cinetella Lm.	0,80—1,50	oleacea Rve.	1—2
laponica L.	2—3	cineracea Rve.	0,50	ornata Schub.	5,—
maculata Sw.	15—20	cinnamomea Ads.	0,50	paligira Sow.	1,—
magnifica Chm. ext.	20,—	clathrata Rv.	0,80—1,50	papalis L.	2—5
marmorata Sws.	30,—	*columbellaria Sc.	0,20—40	pardalis Küst.	0,50—80
megaspira Sow.	20—30	columbellaeformis		patriarchalis Lm.	1—1,50
v. lyrififormis Kien.	50,—	Kien.	2,—	v. tuberosa Rve.	1,—
mitraeformis Lm.	4—6	consanguinea Rv.	0,50—1	paupercula L.	0,60—80
musica L.	1—5	*cornicula L.	0,20—50	v. tigrina Ads.	1,—
Neptuni Gm. extra	5,—	v. lutescens Lam.	1,—	picta Rve.	1—2
nivosa Lm.	2—6	coronata Lm.	0,80—2	plicata Klein.	1—1,50
v. norrisi Sow.	3—4	corrugata Lm.	0,50—1	pontifficalis Lm.	0,50—1,50
nucleus Lam.	5,—	costellaris Lm.	0,50—1	puncticulata Lm.	1—1,50
*olla L. extra	1—3	crassa Sw. def.	1,—	retusa Lm.	0,80—1
pacifica Sol.	4—6	crebrilirata Rve.	1—2	Savignyi Payr.	0,30
v. elongata Sw.	5—6	cremans Rve.	1,—	scabriuscula L.	0,50—2
pallida Gray.	5—8	crenifera Lam.	1—3	scutularia Chm.	0,50—1
papillosa Sws. perf.	40,—	crenulata Lm.	0,50—1,50	v. amphorella Lam.	2,—
" def.	10,—	crocata Lm.	1—1,50	simplex Dkr.	1,—
polyzonalis Lm. def.	5,—	cruentata Ch.	0,60—80	sphaerulata Mart.	1—1,50
perfect M. 40		v. gemmulata Rve.	1,—	stigmataria Lm.	2—4
v. virescens Sol. def.	8,—	cucumerina Lm.	0,50—80	v. granosa Chm.	5,—
perfect M. 40		dactylus L.	1—2	tesselata Mart. ext.	5—10
porcina Lm.	1—3	dermestina Lm.	0,60—80	texturata Lam.	1—2
praetexta Rve. extr.	40,—	digitalis Ch.	1—2	Ticaonica Rve.	1—3
proposcidalis Lm.	2—5	*ebenus Lm.	0,30—50	*tricolor Gm.	0,20
reticulata Rv.	6—12	v. plumbea Lam.	1,50	turgida Rv.	0,40—60
Rossiniana Bern.	15—20	episcopalis L. extr.	0,50—2	variabilis Rve.	2,—
Rückeri Cross.	3—5	exasperata Ch.	0,50—80	vulpecula L.	1,50
rupestris Gm.	1—3	v. torulosa Lm.	1,—		
rutila Brod.	5—10	eximia Ads.	0,50—1	Conohelix.	
scapha Lm.	1—2	exigua v. Maltz.	1,—	conica Schm.	0,40—60
" extra	4,—	fenestrata Lm.	1—1,50	olivaeformis Sw.	0,60—6
undulata Lm.	2—3	ferruginea Lm.	0,50—1,50	punctata Sw.	1—1,50
vespertilio L.	0,50—1	v. rubritincta Rve.	3,—	Vanicorensis Quoy.	1,—
v. mitis Lm.	0,50—1	filaris L.	0,50—1		
vexillum Ch.	3—6	v. nexilis Mart.	0,50—1,50	Marginella.	
volva Ch.	4—8	filum Wood.	1—1,50	albolineata Ads.	1,—
zebra Leach.	2—4	Formosensis Sow.		amygdala Kien.	0,50—80
Mitra.		n. sp.	10,—	angustata Sow.	1—1,50
acuminata Sw.	0,50—1	glabra Sws. defect	2,—	aurantia Lm.	1—2
				Bairstowi Sow.	3—5

	Mk.		Mk.		Mk.
bifasciata Lm. . . .	1—2	fuscata Sow. . . .	0,20-40	flammea L. . . .	1—4
v. pulcherrima v. M.	10,—	laevigata L. . . .	0,20-30	glauca L. . . .	1—2
bivaricosa Lam.	0,50-1	lauta Dkr. . . .	0,30-50	v. coronulata Sow.	1—3
bullata Born extra	6,—	ligula Ducl. . . .	0,60-1	paucirugis Mke.	3,—
catenata Mont.	0,50	lineata Rv. . . .	0,30-50	plicata L. rare extra	20,—
cincta Kien. . . .	2,—	lyrata Sow. . . .	0,50-80	pyrum Lm. . . .	1—2
cingulata Dillw. . .	0,30-50	major Sow. . . .	0,40-60	recurvirostris Wood	1,50-3
conoidalis Kien. . .	0,30-50	mendicaria L. . . .	0,20-30	rufa Sow. . . .	1-1,50
*clandestina Broc.	0,20-30	mercatoria L. . . .	0,20	*saburon Lm. . . .	0,50-1
Cleryi Pet. . . .	2—3	*minor Sc. . . .	0,20-40	v. abbreviata Mont.	3—5
cornea Lm. . . .	0,50-1	mitrata Mke. . . .	0,20	v. japonica Rve. . .	1-1,50
curta Sow. . . .	0,80-1,50	nitida Lm. . . .	0,20	v. nucleola Küst. . .	2,—
diaphana Kien. . . .	0,20-30	nucleus Kien. . . .	0,30-40	v. pila Rve. . . .	0,50-1
flavida Redf. . . .	0,30-50	pardalina Lm. . . .	0,30-50	semigranosa Lam. . .	1—2
glabella L. . . .	1-1,50	picata Sow. . . .	0,30-50	spinosa Gron. rare	15,—
v. irrorata Mke. . .	1—2	recurva Sow. . . .	1—2	strigata Gmel. extra	1-1,50
Goodalli Sow. . . .	10—15	rugosa Sow. . . .	0,30-40	v. zebra Lam. . . .	2—3
guttata Dillw. . . .	0,40-50	*rustica L. . . .	0,20-30	testiculus L. . . .	0,30-1
interrupta L. . . .	0,20	*scripta Lam. . . .	0,20	v. crumena Lam. . . .	0,50-1,50
lactea Kien. . . .	0,20-30	*v. Gervillei Payr.	0,20-30	torquata Rv. . . .	0,30-50
maculosa Kien. . . .	1,—	striata Ducl. . . .	0,30-50	tuberosa L. . . .	1—4
marginata Born . . .	0,80-1,50	strombiformis Lm.	0,40-80	turgida Rve. . . .	1-1,50
*miliaria L. . . .	0,20	sublaevis Mtrz. . .	0,30-50	v. pyrum Lam. . . .	1-2,50
*minuta Pfr. . . .	0,20	*scripta Lam. . . .	0,20	*undulata Gm. typus	1—2
monilis Lm. . . .	0,20-30	turbinella Kien. . .	0,30-40	v. abbreviata L. extr.	1—2
mosaica Sow. . . .	10,—	turturina Lm. . . .	0,30-50	*v. crassa Monter. . .	3—5
muralis Hinds . . .	0,50-80	Tyleri Gray	0,50-80	*v. elongata Monter.	5,—
muscaria Lm. . . .	0,30-50	unicolor Sow. . . .	0,30-50	v. granulata Mont.	3—5
obesa Rdld. . . .	0,30-50	varia Sow. . . .	0,30-50	vibex L. . . .	0,30-1
olivaefermis Kien. .	1,50-2	varians Sow. . . .	0,20-40		
opalina Stearns . . .	1,—	versicolor Sow. . .	0,20-80		
persicula L. . . .	0,50-80	etc. etc.			
Petiti Dv. rarissima	50,—				
piperata Hinds . . .	3,—	Harpa.			
porcellana Gm. . . .	1,50	articularis Lm. extra	1—3		
pseudofaba Sow. . .	10—15	conoidalis Lm. . . .	1—3		
quinqueplicata Lm.	0,50-1,50	costata L. . . .	8—12		
zonata Kien. . . .	1,—	v. imperialis Ch. ext.	5,—	Oniscia.	
v. bilineata Krss. . .	2,—	crenata Sw. . . .	3—6	cancellata Sow. . . .	1—2
		v. testudinalis Lm.	10,—	Lamarecki Less. . . .	4,—
Erato.		gracilis Brod. et Sow.	2—3	oniscus L. . . .	0,30-1
Maugeriae Gray . . .	0,30-50	ligata Mke. species	1—2	v. Lamarecki Desh.	0,50-1
Volvaria.		minor Rumph. extra	0,50-1	tuberculosa Sow. . .	1—2
pallida L. . . .	0,30-60	v. crassa Phil. . . .	0,50-80		
rubella Sow. . . .	0,50-80	nobilis Rumph. . . .	1—3	Dolium.	
*secalina Phil. . . .	0,30-50	rosea Lm. . . .	4—6	ampullaceum Phil.	10,—
v. seminula Gld. . .	1,—	striata Lam. . . .	2,—	Chinense Dillw. . . .	1-1,50
varia Sow. . . .	0,20-30	ventricosa Lm. extr.	0,50-2	costatum Desh. . . .	0,50-1,50
				Cumingi Hanl. extra	3—4
Columbella.				fasciatum Brug. . . .	1-1,50
catenata Sow. . . .	0,30-40			fimbriatum Sow. . .	1—2
cribaria Lm. . . .	0,20			*galea L. extra	2—4
dichroa Sow. . . .	0,20-30			v. epidermata Greg.	8,—
elegans Ad. . . .	0,30-40	extra	0,50-1	v. spiritorsum Gray	10,—
Essingtonensis Rv.	0,30-50	cernica Sow. n. sp. .	3—5	lactescens Mart. . . .	1—3
ferruginosa Rv. . . .	0,30-40	Ceylanica Lam. . . .	1-1,50	Lischkeanum Küst.	3—5
festiva Kien. . . .	0,20-30	coarctata Gray . . .	1—2	luteostomum Küst.	3—5
flavida Lm. . . .	0,40-60	cornuta L. . . .	2—5	maculatum Lm. . . .	0,50-1,50
fulgurans Lm. . . .	0,20	decussata L. . . .	1—2	olearium L. . . .	0,50-1,50
v. punctata Lm. . .	0,20-30	erinacea L. . . .	0,50-1	pennatum Mörch. . .	2,—
		fimbriata Quoy extr.	3—5	perdix L. . . .	0,50-1,50

	Mk.		Mk.		Mk.
variegatum L. extr.	2-5	didyma Bolt extr.	0,50-2	papyracea v. d. B.	1-2
variegatum L. . .	2-4	Dillwyni Ph. (Payr.)	0,30-50	Panamensis Reclz.	1-2
zonatum Green. . .	1-2	Dillwyniana Reclz.		pellis-tigrina Ch. .	0,50-1
Malea.		W. Ind.	0,30-50	v. maculosa Lam. .	1-1,50
dentata Born . . .	4-6	duplicata Say. . .	2,—	pes-elephantis Chm.	
latilabris Val. vera	10,—	fanel Ads. . . .	1-2	juv.	1,—
pomum L. . . .	0,30-1	filosa Sow . . .	0,50-1	Petitveriana Reclz.	
Sycotypus.		*flammulata Reg. .	0,50-1	c. op.	1-2
decussata Wood . .	1-3	Flemingiana Reclz.	1,50	ponderosa Ph. . .	0,50-1
Dusumieri Val. . .	1-2	fluctuata Sow. . .	1-2	Powisiana Reclz. .	2-3
ficus L. . . .	0,50-1,50	forata Reclz. . .	0,30-50	*pulchella Risso . .	0,20-40
ficoides Lam. . . .	0,50-1,50	Fortunei Rve. . .	2,—	pyriformis Reclz.	
papyracea Say . . .	1-3	fulminea Gm. . .	0,50-1,50	species	0,50-1
reticulata Lm. . . .	0,50-1,50	v. punctata Sws. .	2,—	Raynaudiana Reclz.	0,50-1
tesselata Kob. . . .	10,—	fusca Carp. . . .	2,—	Recluziana Desh.	
Velutina.		*fusca Blv. . . .	1,50	c. op.	1-3
*laevigata L. . . .	1,—	glaucia Humb. . .	1-2	rufa Born	0,50-1
Cryptocella.		glaucina Lam. . .	1-2	v. spadicea Gm. . .	1-1,50
Berghi Desh. . . .	2-3	Gochet Ads. . . .	2,—	Sebae Soul. . . .	1-1,50
Natica.		Gualteriana Pet. .	0,30-50	simiae Ch. . . .	0,60-1
*affinis Gm. . . .	0,30-1	*Guillemini Payr. .	1,—	v. simioides Reclz.	1,—
alapapilionis Ch. .	0,50-1	*hebraea Mart. . .	0,50-1	solida Blvll. . . .	0,30-50
v. articulata Phil. .	1,50	helvacea Lam. . .	2,—	Strangei Rv. . . .	0,50-1
v. taeniata Mke. . .	1,50	*heros Say	0,50-3	sulcata Born . . .	1-1,50
albula Reclz. . . .	0,50-1	v. triseriata Say .	0,30-50	*triseriata Say . .	0,40-60
*Alderi Forb. . . .	0,30	immaculata Tott. .	0,50	uber Val. . . .	0,50-1
*v. lactea Jeffr. . .	0,50	imperforata Sow. .	0,30-50	umbilicata Quoy . .	1,—
*v. Macrochiensis, Phil	0,40-60	v. genuana Rve. .	0,50-1	unifasciata Lam. .	0,50-1
*v. nitida Forb . . .	0,30-50	*intricata Don. . .	0,20-50	v. avellana Phl. . .	0,50-1
*v. ventricosa Jeff. .	0,30-50	v. Valenciennesi P.	0,50-1	v. lurida Phil. . .	0,50,80
albumen L. . . .	1-2	*Josephinia Risso .	0,30-80	variabilis Reclz. .	0,50-1
ampla Ph. . . .	1-2	v. alba Reclz. . .	1,—	Vavaosi Leg. . . .	1,—
areolata Reclz. . .	0,50-1	v. glaucina Salis .	1,50	vesicalis Phil. c. op.	1-2
aurantia Lm. . . .	0,50-1	lactea Guild. . . .	0,40-60	violacea Sow. . . .	1-1,50
v. straminea Reclz.	0,50-1	Lamarckiana Reclz.	2-3	vitellus L. extra	0,50-1
bicolor Ph. . . .	0,60-1	Lewisi Gld. extra	3-5	zebra Lam. . . .	1-1,50
bifasciata Gray . .	1-2	lineata Lm. . . .	0,50-1	Amauropsis.	
Campechiensis Reclz.	2-3	macrostoma Phil. .	1-1,50	*helicoides Johnst. .	1-2
cancellata Born . .	1,—	Maheensis Reclz. .	0,50-1	Sigaretus.	
canrena L. . . .	0,50-2	mamilla L. . . .	0,30-50	cymba Mk. extra .	1-3
v. lemniscata Lam.	1,—	mamillaris Lm. . .	0,40-1	depressus Phil. . .	1-2
Chemnitzii Recl. .	1-3	Marochiensis Gmel.	0,30-50	Javanicus Gray . .	0,50-1,50
*catena D. C. extra	0,50-1	v. Californica Conr.	1,50	laevigatus Lam . .	2,—
v. castanea Lam. . .	1,—	v. livida Müll. . .	1,—	Leachi Blvll. . . .	1-1,50
catenata Ph. . . .	0,50-1	Maroccana Ch. . .	0,30-50	maculatus Say . . .	2-3
cernica Jouss. . . .	1,—	maura Brug. . . .	1-2	Martinianus Phil. .	0,50-1
Chinensis Lm. . . .	0,30-50	melanostoma Gm. .	0,30-50	neritoideus L. . . .	0,50-1,50
citrina Lam. . . .	1-1,50	v. melanostomoides		perspectivus Say .	1-2
*clausa Brod. . . .	0,50-1	Quoy	1,—	planulatus Reclz. .	0,50-1
*v. consolidata Couth	2,—	v. succinoides Rve.	1,—	zonalis Cruoy . . .	2,—
v. janthostoma Dsh.	3,—	v. zanzebarica Reclz.	1,50	Scalaria.	
collaria Lam. . . .	0,50-1	melastoma Sw. . .	0,30-50	alata Sow. . . .	2-3
v. gambiensis Reclz.	1,—	*millepunctata Lm.	0,40-1	aculeata Sow. . . .	1-2
columnaris Reclz. .	1-2	v. maculata Desh.	1-2	aurita Sow. . . .	1-1,50
Cumingiana Reclz.	2,—	*monilifera Lam. .	0,30-1	australis Lam. . .	1,—
conica Lm. . . .	0,30-50	*Montacuti Forb. .	0,50	borealis Gould . .	2,—
		orientalis Gm. . .	1-2	casta Ads. . . .	1,—
		*pallida Brod.			
		=groenlandica Beck	1-1,50		

	Mk.		Mk.		Mk.
*comunis Lm. . . .	0,30-50	v. casta Hinds . .	1,—	scitulus Ads. . . .	2,—
*v.variegatus L.extra	1-1,50	v. costata Mke. . .	1,—	sulcatus Ads. . . .	0,50-80
coronata Lam. . . .	1-3	inconstans Hinds .	5,50	terebellum Lam. . .	0,50-1
crenata L.	1-2	Kieneri Desh. . . .	1,50	teres Ads.	2,—
crenatoides Carp. .	2,—	laevigata Gray . .	1-2		
Eschrichti Holb. . .	2,50	lanceata L.	0,50-1,50	Ringicula.	
*Groenlandica Ch. .	1-3	luctuosa Hinds . .	0,50-1	grandinosa Hinds .	1,—
Georgettina Kien. .	2,—	lingualis v. insignis		propingians Hinds	1,—
granulata Quoy . .	1-3	Desh.	8-10		
Juckesiana Forb. .	1,—	maculata L.	0,50-1,50	Chemnitzia.	
*lamellosa Lam. . .	1-1,50	" extra	3,—	*delicata Mte. R. . .	0,20-30
lineata Say	1-1,50	marmorata Desh. .	3-5	elongata Pse. . . .	1-1,50
lineolata Sow. . . .	2-3	mera Hinds	1,50	*excavata Phil. . . .	1,—
lyra Sow.	3,—	micans Hinds . . .	1,—	*fenestrata Forb. .	1,—
neglecta Ads. et Rve.	5,—	modesta Desh. . . .	1,—	*lactea L.	0,20-30
occidentalis Nyst. .	3,—	monilis Quoy . . .	1-2	*indistincta Mtg. . .	0,20-30
*pseudoscalaris Broc.	0,30-1	muscaria Lm. . . .	0,50-150	*pusilla Phil. . . .	0,30-40
*v. lamellosa Jan. .	1-1,50	myuros Lam. extra	1-3	*rufa Phil.	0,50-1
*Trevelyana Leach. .	0,50	nimbosa Hinds . .	0,40-80	*striolata L.	0,20-30
*Turtonis Risso . .	0,50-1	occulata Lm. extra	1-3		
*v.planicostatus Phil.	3,—	ornata Martyn . . .	8-10	Odostomia.	
venosa Sow.	0,30-50	penicillata Hinds .	1,—	*acuta Jeffr.	0,20-40
Terebra.		v. venosa Hinds . .	1,50	*conoidea Broch. . .	0,20-40
aciculata Lam. . . .	0,30	pertusa Sw.	1-2	*decussata Mtg. . . .	0,50
v. Cosentini Phil. .	0,50	pulchella Desh. . .	2,—	eulimoides Hanl. . .	0,50
affinis Gray	0,30-50	puncticulata Desh.	2,—	*eximia Jeffr. . . .	0,20-40
anomala Gray	1-2	pura Desh.	2,—	*plicata Mtg.	0,30-50
aspera Lam.	1-1,50	raphanula Desh. . .	3-5	*polita Biv.	0,30-50
v. Petitveriana Desh.	1-1,50	rudis Gray	1-2	*rissoides Hanl. . . .	0,30-40
Babylonia Lm. . . .	1-1,50	Salleana Desh. . . .	2,—	*spiralis Mtg.	0,20-40
bacillus Desh. . . .	1,—	Senegalensis Lm. .	0,50-1,50	*truncatula Jeffr. sp.	1,50
Bernardi Desh. . . .	2,—	v. speciosa Desh. .	2-3	*turrita Hanl.	0,20-40
bifrons Hinds	1-3	v. striatula Lam. .	2,—	*unidentata Mtg. . .	0,20-40
caerulescens Lm. . .	0,30-50	simplex Carp. . . .	0,30-50		
v. castanea Kien. . .	2,—	solida Desh.	2,—	Aclis.	
v. flammulata Mart.	1-1,50	spectabilis Hinds .	3,—	Walleri Jeffr. . . .	1,50
cancellata Quoy extra	2,—	splendens Desh. . .	3-4		
cerithina Lam. . . .	0,40-50	strigata Sow. . . .	2-3	Eulima.	
chlorata Lam. . . .	0,60-1	strigillata L. . . .	0,30-40	exilis Pse.	1,—
cinerea Born	0,30-50	subulata L. extra	1-3		
corrugata Lam. . . .	3-5	v. consobrina Desh.		Stylifer.	
crenulata L. extra	1-1,50	def.	1,—	*Turtoni Brod. . . .	5,—
Cumingi Desh. . . .	8-15	Swainsoni Desh. . .	2,—		
cingulifera Lam. . .	1-1,50	textilis Hinds . . .	1,—	Solarium.	
v. laevigata Quoy . .	2-2,50	v. nodularis Desh.	1,50	cingulatum Kien . .	1-2
dimidiata L.	0,50-1	tigrina Gm.	0,50-1	v. subconcolor Chm.	3,—
" extra	2,—	triseriata Gray . .	1-3	dorsuosum Hinds . .	2,—
dislocata Say	0,50-80	undulata Gray . . .	0,50-1,50	infundibuliforme Gm.	1,50
dispar Desh.	1,—	varicosa Hinds . . .	1,50	v. strigata Hanl. . .	2,—
duplicata L.	0,50-1	variegata Gray . . .	0,50-1,50	laevigatum Lam. . .	2,—
v. Lamarecki Kien. .	0,50-1	v. albocincta Gray	2-3	luteum Lm.	0,50-80
v. Reevei Desh. . . .	2,—			maximum Ph.	2-5
Dussumieri Kien. . .	1-3	Pyramidella.		Mighelsi Phil.	2,—
exigua Desh.	1,—	auris-cati Ch. . . .	0,50	perdix Hinds	1-2
fimbriata Desh. . . .	5,—	nitida A. Ad. . . .	0,50	perspectivum L. . .	1-2
fulgurata Phil. . . .	0,30-50	proquinqua A. Ad.	0,50		
flammea Lam. extra	10 u. 20	Obeliscus.		extra	
funiculata Hinds . .	1-2	dolabratus L. . . .	0,50	(grande)	3,—
hastata Gm.	0,30-50	punctatus Ch. . . .	1-2	v. trochlearis Hinds	1-3
				pictum Phil.	2-3
				purpuratum Hinds.	2,—
				Taylori Hanl.	5,—
				variegatum Gm. . . .	0,50

	Mk.		Mk.		Mk.
Scissurella.		cyanostoma Ads. . .	2,—	magnificus Rv. . .	2—5
crispata Flem. . .	1,—	daucus Brug. . .	1—4	magus L. . . .	0,50-1
Conns.		distans Brug. . .	1—3	v. carinatus Sow. . .	1—2
abbas Brug. . . .	2—4	eburneus Brug. . .	0,30-1	v. consul Boiv. . .	2—3
abbreviatus Nutt. . .	1—3	v. polyglottus Ads.	2,—	v. epistomium Rve.	3—4
achatinus Ch. . . .	2—4	emaciatus Rv. . .	1-1,50	v. raphanus Brug. .	2—3
v. ranunculus Brug.	3—5	emarginatus Rve. .	3—5	mahogani Rv. . . .	1—3
acuminatus Brug. .	1—2	encaustus Kien. . .	3,—	Malaccanus Brug. .	15—20
v. alba Brug. . . .	3,—	episcopus Brug. ex.	1—3	Maldivus Brug ext.	1—3
v. scularis Jick. . .	2,—	Erythraeensis Bk. .	0,50-1	Maltzanianus Hkff.	2—3
acutangulus Brug. .	3,—	v. Dillwyni Rve. .	1,50	Marchionatus Wds.	6—20
Adansoni Lam. . . .	2—3	figulinus L. . . .	0,50 1	marmoreus L. . . .	0,50-1,50
Algoensis Sow. def.	1,—	extra	3,—	extra	2—3
amadis Ch.	1-2,50	v. Loroisi Kien. . .	3—5	v. bandanus Brug.	1—3
ambiguus Rve. . . .	1—5	flavidus Lam. extra	0,50-1	v. bandanus extra	4—5
anceps Ads.	3,—	Floridanus Gabb. .	10,—	v. nigrescens Sow.	3,—
anemone Lm.	1—2	fulmen Rve.	10,—	*Mediterraneus Hw.	0,50-2
arachnoideus Gm.	1-1,50	generalis L.	1—2	v. hybridus Kien .	1-1,50
arenatus Brug. . .	0,50-1,50	genuanus L.	2—6	*v. minor Monteros	1,50
v. granulatus Brug	2—3	geographus L. . . .	1—2	v. pusio Lam. (spec.)	0,50-1
v. minor Brug . . .	1,—	extra	3,—	mercator L.	1—2
aristophanes Ducl. .	3—5	v. intermedius Rve.	6—10	v. desidiosus Ads.	3,—
augur Brug	1—3	(species)	6—10	miles L.	0,50-1,50
aulicus L.	3—5	gladiator Brod. . .	1,—	extra	2—3
aurantius Brug. . .	5—20	glans Hw. extra .	1—3	miliaris Brug. ext.	0,50-1,50
aureus Brug.	6—10	gloria maris Chm.		Mindanus Brug. . .	10,—
aurisiacus L.	10—30	fine	2000,00	minimus L.	0,20-50
Australis Ch. . . .	2—3	gubernator Brug. .	1—4	mitratus Hw. . . .	3—6
Bairstowi Sow. n.sp.	10,—	Hebraeus L.	0,30-1,50	monachus L.	1—2
betulinus L.	1—3	v. vermiculatus L.	0,50—2	monile Hw. extra	1—3
extra	5,—	hyaena Lam.	5,—	mus Brug.	0,30-50
boëticus Rve.	2—3	hybridus Kien. . .	3—5	musicus Brug. . . .	0,30-50
brunneus Gray. . .	1—3	Janus Brug.	4,—	v. Mighelsi Kien. .	1,—
bullatus L.	3—8	Japonicus	3—5	mustelinus Brug . .	1—2
Cabriti Bern.	2,00	imperialis L. . . .	1—3	v. Cecilliae Chenui	2—3
Californicus Hinds.	0,50-1	extra	3—5	v. sulphuratus Brug.	1—5
canonicus Brug. . .	0,50-2	v. fuscatus Lam. . .	3—5	nanus Brod.	0,30-50
capitaneus L. . . .	0,50-1,50	v. viridulus „ ext.	3—5	nebulosus Sol. . . .	1—5
catus Brug.	0,40-1	infrenatus Rve. . .	3—5	Nemocanus Brug. .	1—3
cedo-nulli Klein. .	10—30	interruptus Brod .	2,—	nigropunctatus Sow.	1,50
centurio Born. . . .	125,00	L'Argillierti Kien		nocturnus Brug. . .	3—8
cernicus Ads.	3,—	def.	1—3	v. Deburghiae Sow.	10—15
Ceylonensis Brug. .	1,—	leoninus Ch.	2—3	Nova Hollandiae Ad.	1,—
Ceylonicus Ch. . . .	1—2	ligarius Rve. . . .	1—2	nussatella L. . . .	0,50-2
characteristicus Ch.	2—4	v. fasciatus Kien. .	1,50	nux Brod.	0,30-50
Chenui Crosse . . .	10,—	lineatus Ch.	0,50-1,50	obscurus Rve. . . .	1—2
cinerus Hw.	2,—	lithoglyphus Meusch	1-2,50	olivaceus Kien. . .	2,—
circumcisus Born. .	10—20	litteratus L.	1—2	omaria Brug. extra	1—2
classarius Brug. . .	1—2	extra	3,—	Orbignyi Aud. fine	20—30
v. Pazi Bern.	3,—	v. millepunctatus		panniculus Lam. . .	3—5
Clarus E. Sm.	3,—	Lam. extra	1—3	papilionaceus Brug.	2—5
coccineus Gm.	25,—	lividus Brug. . . .	0,50-1	v. Canariensis Brug.	
coffea Gm.	2—3	v. citrinus Gemel. .	1—3	fine	8,—
v. fumigatus Brug.	5,—	v. crepusculum Rve.	5,—	parius Rv.	1-1,50
columba Brug. . . .	0,50-1	v. sugillatus Rve.	2—3	parvus Pse.	1—2
consors Sow. extra	2—3	Loveni Krss.	1—2	pennaceus Born . .	2—3
consorsus Rve. . .	2—3	lucidus Mawe . . .	2—4	pertusus Brug. . .	5—8
coronatus Dillw . .	2—3	maculosus Sow. . .	2,—	pigmentatus Ads.	
		Madagascariensis S.	3—5	et Rve.	1—2

	Mk.		Mk.		Mk.
planorbis Born extra	0,50—2	terebellum Mart.	1—2	epidromis L.	0,50-1
pontificalis Lam.	3—5	tessellatus Born.	0,50-1	fasciatus Born.	0,30-60
Portoricanus Brug		extr.	2,—	floridus Lm.	0,20-30
def.	3—5	v. crassus Sow. def.	1,—	v. mutabilis Sw.	0,30
princeps L.	2—4	terminus Lam.	2—4	v. furiformis Sow.	1,—
v. regius Ch. extra	15,00	testudinarius Mart.	2—3	galeatus Wood	8—10
Prometheus Brug.		v. Guinaicus Brug.	2—3	gallus L.	1—3
def.	5,00	v. narcissus Lam.	3—4	gibberulus L.	0,20-50
propinguis Smith	3,—	v. Madagascariensis		v. rhodostomus Moer.	1-1,50
Protheus Brug.	3—5	Sow.	3,—	gigas L. fine	3,—
pulchellus Sw.	4—6	v. scriptus Sow. ex.	2—5	gracilor Wood	1-1,50
v. cinctus Sw.	3—5	v. telatus Rve. ex.	6,—	granulatus Wood	1-1,50
pulcarius Brug.	0,50-1	v. vericulum Rve.		guttatus Mart.	0,50-80
v. fustigatus Brug.	0,50-1	extr.	1—3	haemastomus Sow.	1-1,50
punctatus Sow.	3,—	v. vicarius Lam. ex.	1—3	Japonicus Rve.	1—3
puncticulatus Brug.	0,30-50	*textile L.	1—3	Isabella Lm.	0,40-60
purpurascens Brod	2—4	tornatus Brod.	3,—	labiosus Gray	2,00
v. luzonicus Sow.	5,—	tulipa L.	1—2	laciniaus Ch.	6—12
v. regalitatis Sow.	3—5	L. extra	3,—	latissimus L.	10—15
pusillus Chm.	0,50-1	varius L.	1—2	lenticinosus L.	0,50-1
pygmaeus Rv.	0,30-50	Vautieri Kien.	3—4	lobatus Sw. extra	0,50-1,50
pyramidalis Lam.	3—5	venulatus Hw.	1—3	Luhuanus L.	0,30-50
pyriformis Rv.	5—10	v. nivosus Lm.	1—2	v. laevilabris Mke.	2,—
quercinus Brug.	0,50-1	verrucosus Brug.	1,—	maculatus Nutt.	0,60-1
extra	2,00	vexillum Gm.	1—3	marginatus L.	1—2
radiatus Gm.	3,—	extr.	4,—	minimus L.	0,30-50
v. parius Rve.	1—2	Victoriae Rve.	5—8	papilio Ch.	4—6
regularis Sow.	2—4	virgo L.	0,50-1	pacificus Sw. extra	3—4
retifer Mke. (minor)	3—5	L. extra	2,—	v. Australis Sow.	2—3
rosaceus Ch.	3—5	virgatus Rv.	3—5	Peruvianus Sw.	5,—
v. signifer Crosse	3,—	vitulinus Brug.	0,50-1	pugilis L.	0,50-1
v. Tinianus Rve.	8,—	vulpinus Brug.	1—2	Rüppelii Rv.	0,50-1
roseus Lam.	1—3			Samar Ch.	0,60-1
scabriusculus Ch.	1—3	Dibapaus.		septimus Ducl.	2,—
senator L. extra	1—2	edentulus Phil.	3—6	succinctus L.	0,50-1
Siamensis Brug.	10,—	Strombus.		Swainsoni Rve.	4—6
simplex Sow.	2,—	alatus Gm. extra	2—3	terebellatus Sow.	1-1,50
spectrum L.	1—3	auris-Dianae L.	0,40-60	thersites Gray	45,—
v. lacteus Lam.	5,—	extra	1,—	tricornis Lm.	0,50-1
v. subulatus Sow.	3—4	v. melanostomus S.		Lm. extra	2,—
splendidulus Sow.		spec.	2—3	urceus L.	0,20-50
(minor)	10,—	bubonius Lm.	3—5	v. chrysostomus R.	0,50-80
sponsalis Ch.	0,30-50	bulbulus Sow. fine	3—5	variabilis Sw.	0,50-80
stercus musarum L.	0,50-1,50	Campbelli Gray	1-1,50	vitatus L.	1—2
stramineus Lam.	2—3	canarium L.	0,30-50	v. turritus Lam.	3—5
striatus L.	0,50-1,50	columba Lam.	0,50-1	Pterocera.	
subulatus Kien. non		costatus Gm.	5—8	aurantia Lm.	1-1,50
Sow.	10,—	v. inermis Sow.	8—10	bryonia Gm.	3—5
sugillatus Rv.	1—3	v. cylindricus Sw.	0,40-80	chiragra L.	1—2
sulcatus Brug.	1—2	v. mauritianus Lam.		elongata Sw.	2—4
Sumatrensis Brug.	2—4	extra	1—2	lambis L.	0,50-1
tabidus Rv.	2—3	deformis Gray	5,—	millepeda L.	2—3
taeniatus Brug.	1—2	dentatus L.	1,—	rugosa Sow.	1—2
Tahitensis Brug.	1-1,50	v. corrugatus Ads.	1,50	scorpio L.	1-1,50
v. rattus Brug.	0,50-1	v. erythraeus Chm.	1,50	violacea Sw.	3—10
tabidus Rv.	2—3	v. elegans Sow. (sp.)	0,50-1	Rostellaria	
taeniatus Brug.	1—2	v. plicatus Lam.	0,50	curvirostris Lm.	2—3
tendineus Brug fine	10,—	v. rugosus Sow.	1,—	ex. fine	5,—
tenuisulcatus Sow.	2—3	dilatatus Sow.	3,—	cancellata Lam.	2,—

Aporrhals.		Mk.			Mk.			Mk.
*occidentalis Beck .	5—8		Goodallii Gray . .	0,50-1		tigris L. extra . .	0,30-1	
*Mac Andreae Jeffr.	8,00		helvola L.	0,10-20		turdus Lm.	0,20-40	
*pes-carbonis Brug.	2—3		hirundo L.	0,10-30		umbilicata Sow.		
*pes-pellicani L. . .	0,30-1		histrio Gm.	0,50-1		extra	15,—	
extra	2,—		irrorata Soland . .	0,50-60		ventriculus Lm.	0,60-1,20	
Senegalensis Gray			Isabella L.	0,10-40		vitellus L.	0,20-50	
vera!	10,00		Lamarekii Gray	0,40-80		ziczac L.	0,30-50	
Struthiolaria.			Listeri Gray	2—3		Trivia.		
Australis Gm. . . .	1,50-2		*lurida L.	0,30-1		Adamsoni Gray . .	3,—	
pes-struthio-cameli.			lueta Gronov	2—3		annulata Gray . .	0,60-1	
Chm.	2—3		lynx L.	0,10-40		Australis Lam. . .	0,50-80	
scutulata Martyn . .	2—3		margarita Sol. . . .	2,—		Californica Gray .	1—2	
scutulata Mart. . .	1—3		Mauritiana L. . . .	0,50-1		Childreni Gray . .	0,50-1	
vermis Mart.	2—3		microdon Gray . . .	0,30-50		cicercula L.	0,20-40	
v. crenulata Lam.	5,—		miliaris Gm.	0,40-80		costata Gm.	3—5	
Terebellum.			moneta L.	0,10-20		*Europaea Mtg. . .	0,10-30	
subulatum Lm. fine	1—3		v. icterina Lm. . . .	0,20-30		grando Gask. . . .	1,—	
Cypraea.			mus L.	0,40-60		globula L.	0,50	
albuginosa Mawe . .	2—3		v. bicornis Sow. . .	1,50		insecta Mighls. . .	0,50	
angustata Gm. . . .	1,50-3		neglecta Lm.	0,30-50		Madagascariens Gm.	3—5	
annulus L.	0,10-30		nigropunctata Gray	10,—		nucleus L.	0,30-60	
v. pura	0,50		obvelata Lm.	0,20-50		v. cerea L.	1,—	
Arabica L.	0,20-1		ocellata Lm.	0,20-30		onicus Lm.	2—3	
Arabica Lm.	0,40-50		onyx L.	1-1,50		oryza Lm.	0,20-30	
aenosa Gray	0,50-1		v. adusta Lm. fine	1-1,50		ovula Lm.	1—2	
Argus L.	1—2		v. succinatus L. . .	2,—		pacifica Gray . . .	1-1,50	
asellus L.	0,10-20		Oweni Sow.	2,—		pediculus L. . . .	0,20-30	
Beckei Gask.	3,—		v. Menkeana Desh.	2,—		*pulex Soland. . .	0,20-30	
camelopardalis Per.	2—3		pallida Gray	5—8		pustulata Lm. . . .	0,50-1	
Capensis Gray . . .	4—6		pantherina Soland .	0,30-80		quadripunctata Gray	0,20-30	
caput-serpentis L.	0,20-30		*physis Broch. extra	15—20		radians Lm.	0,50-80	
carneola L.	0,20-1		pieta Gray	2,—		rubinicolour Gask. .	1—2	
caurica L.	0,20-50		piperita Sol.	2,—		sanguinea Gray . .	0,30-50	
cernica Sow.	1—2		poraria L.	0,20-30		Solandri Gray . . .	0,40-50	
cervinetta Kien. . .	0,50-1		punctata L.	0,40-80		staphylaea L. . . .	0,10-30	
cervus L.	1—4		v. stercus-muscarum			v. limacina Lm. . .	0,10-30	
cinerea Gm.	1—2		Lam.	1,—		subrostrata Gray .	1,—	
clandestina L. . . .	0,10-20		punctulata Gray . .	0,30-50		suffusa Gray	0,20-30	
Comptoni Gray . . .	1—2		*pyrum Gm.	0,50-1		tricornis Rob. . . .	2—3	
ciibaria L.	0,50-1		pyriformis Gray . .			Ovula.		
cruenta Gm.	0,30-60		v. Smithi Sow. . . .	5,—		Adriatica Sow. fine	1,—	
v. variolaria Lam.	1-1,50		quadrimaculata Gray	1—2		bullata Ads et Rve.	1,50	
Cumingii Gray . . .	1—2		reticulata Martyn . .	0,30-1		carnea Poiret . . .	0,20-30	
cylindrica Born . . .	1—2		sanguinolenta Gm.	1—2		concinna Ad. et Rve.	0,60-80	
dilicium Rve.	0,30-50		scurra Ch.	0,50-1,50		lactea Lm.	1-1,50	
edentula Sow. . . .	1—2		Sowerbyi Kien. . . .	1—2		ovum L.	0,50-1	
erosa L.	0,10-30		spadicea Sws.	10—15		tortilis Martyn . . .	3—5	
errones L.	0,10-30		*spurca L.	0,30-50		Calpurnus.		
esontropia Ducl. . .	1—2		stercoraria L.	0,50-1,50		verrucosus L. . . .	0,50	
exanthema L.	0,50-1		L. extr.	2—3		Cyphoma.		
felina Gm.	0,30-60		stolida L.	1—2		gibbosa L.	0,20-30	
v. fabula Kien. . . .	1,—		subcylindrica Sow.	1—2		Birostra.		
fimbriata Gm. . . .	0,20-30		subviridis Rv. . . .	3,—		acicularis Lam. . .	3,—	
flaveola L.	2—3		suleidentata Gray .	20—30		volva L.	1,50-3	
fusco dentata Gray	10—20		tabescens Soland. . .	0,50-1		Simnia.		
gangrenosa Dill. . .	0,20-40		talpa L. extr. . . .	0,50-1,50		spelta L.	1-1,50	
v. Reentzi Dkr. (sp.)	10,—		teres Gmel.	1,—		triticea Lam. . . .	2,—	
			testudinaria L. . . .	1,50-3				
			Thersites Gray extr.	12,—				

Pedicularia.		Mk.			Mk.	Potamides.		Mk.
elegantissima Desh.	1—2		Thomasiana Cr. fin.	10—15		ebenius Brug.	0,60-1	
Pacifica Pse.	1-1,50		tuberculosa Sow.ex.	10—15		pacificus Sow.	1—2	
sicula Sow.	3,—		undulata Sow.	2—3		Tympanotonos.		
Cancellaria.			urceolata Hinds fine	3—5		fluviatilis Pot. et M.	0,60-1	
albida Hinds	2—3		Verreauxi Kien.	15,—		v. microptera Kien.	0,60-1	
Angasi Crosse	2—3		*viridula Fab.	0,50-1		fuscatus L.	0,40-80	
articularis Sow.	3—5		*v. elongata Leche	2,—		v. radula L.	0,40-60	
asperella Lam.	3—5		*v. laevior leche	1-1,50		Oweni Fér.	0,50-1	
Bocageana Cross.	2—3		Trichotropis.			Pyrasus.		
brevis Sow.	3—5		borealis Brod. et S	1—2		palustris L.	1-1,50	
buccinoides Sow.	1—3		*v. acuminata Jeffer.	1,50		semisulcatus Bolt.	0,60-80	
bullata Sow.	6—8		*insignis Middf.	1—2		sulcatus Brug.	0,30-50	
cancellata L. extr.	1—2		*cancellata Hinds	2,—		v. Molluccanus Gm.	1,—	
v. senegalensis			*St. Johnensis Verkr.	3,—		Telescopium.		
v. Maltz. extr.	3—5		Cerithium.			fusum Schmch.	1—2	
cassidiformis Sow.	3—6		atratum Born	0,20-40		Cerithidea.		
„ extra fine	10,—		caeruleum Sow.	0,20-40		decollata L.	0,30-50	
chrysostoma Sow.	3—5		caudatum Sow.	1,50		iostoma Pfr.	0,50	
clavata Sow.	8,—		columna Wood	0,40-50		Mazatlanica Charp.	1,—	
costifera Sow.	1—2		Erythraeense Lm.	0,40-80		obtusa Wood	0,30-60	
crenifera Sow.	2—3		ferrugineum Say	1,—		v. Kieneri		
eburnaeformis Rve.	3—5		v. versicolor Ads.	1,—		Homb. et J.	1-1,50	
elegans Sow.	3—4		*Mediterraneum Dsh.	0,20-30		rhizoporarum Ads.	0,60-1	
excavata Sow.	15—20		morus Lm.	0,30-40		sacrata Gould	0,50	
Forestieri Montrz.	10,—		v. variegatum Quoy	0,30-40		v. albonodosa Carp.	0,80	
foveolata Sow.	6—8		nodulosum Brug.	0,60-1		v. fuscum Gould.	1,50	
goniostoma Sow.	3—5		rubus Mart.	1,—		scalariformis Say	1,—	
granosa Sow.	4—6		Schroeteri Mörch.	1—2		Paludomus.		
haemastoma Sow.	3—5		septemstriatum Say	1,—		Chilinoides Rv.	0,30-50	
identata Sow.	3,—		tuberculatum L. ext.	1,—		Gardneri Rve	0,30-50	
v. affinis Rve.	3,—		*vulgatum Brug.	0,20-50		loricatus Rv.	0,60-1	
Lamberti Sow.	4—6		Vertagus.			phasianinus Rve.	0,20-50	
lamellosa Hinds	3—4		aluco L.	0,40-60		stephanus Bens.	1,—	
littorinaeformis Sow.	3—5		asper L.	0,30-40		Tennanti Rve.	0,50	
mitraeformis			v. lineatus Lm.	0,40-50		Leptoxis.		
Brocchi fossil	1,50		fasciatus Brug.	0,40-80		praerosa Say	0,10-20	
nodulifera Sow.	5—10		v. procerum Kien.	0,40-80		rubiginosa Lea	0,20-30	
f. gigantea ext.	20,—		v. Martianus Pfr.	1,—		subglobosa Say	0,30	
obesa Sow.	3—5		obeliscus Brug.	0,30-50		v. globula Lea	0,30	
obliquata Lm.	2—3		Pharus Hinds	0,50-1		tintinnabulum Lea	0,20-30	
oblonga Sow.	10,—		pulcher A. Ad.	0,50-60		Jo.		
ovata Sow. ext.	5—10		Sowerbyi Kien.	2,50		spinosa Lea	1,—	
piscatoria Gm.	1—3		vertagus L.	0,30-40		Melania.		
pulchra Sw. ext. fine	20,—		vulgaris Schm.	0,50		acanthica Brod.	1-1,50	
reticulata L. ext.	2—5		v. taeniatus Quoy.	1,50		amarula L.	0,40-60	
rigida Sow.	2—5		Bittium.			Amurensis Gerstf.	0,40-60	
rugosa Lam.	1—3		filosum Gould	0,30-50		anthracina v. d. B.	1—2	
scalata Sow.	1—2		*reticulatum Cost.	0,10-20		arachnoidea Anth.	0,20-30	
scalariformis L.	15,—		Triphoris.			arthurii Brot.	0,80-1	
scalarina Lam.	6—10		Bermudae Sow.	1,—		v. minor	0,50	
semidisjuncta Lam.	5—8		*perversus L.	0,20-40		asperata Lam.	0,50-1,50	
similis Sow.	1—3		Lampania.			aspirans Hinds	0,60-1	
solida Sow.	6,—		Cumingi Crosse	1,—		v. macrospira Morl.	1,—	
Spengleriana Desh.	2—3		multiformis Lschk	0,30-50		atorina Lea	0,20-30	
v. tritonis Sow.	3,—		zonalis Brug.	0,50		aurita Müll.	0,40-50	
spirata Lam.	8—10		v. aeterrima Dkr.	1,—				
Sowerbyi Crosse	15,—							
tesselata Sow.	4—6							

	Mk.		Mk.		Mk.
aurorana Hartm.	2—3	variabilis v. d. Busch	2,—	Risella.	
canaliculata Say	0,30-40	villosa Phil.	1-1,50	Isselli Semp.	0,50
castanea Lea	0,10-20	virginica Gm.	0,20	Lacuna.	
clava Mke.	2,—	v. multilineata Say	0,50	*divaricata Fabr.	0,20-30
dactylus Lea	0,50-1	virginica Say	0,30	*v. bifasciata Brown.	0,50
depygis Say	0,10-20	Winteri v. d. B.	1,—	Quoyia.	
elegans Bens.	0,30-50			decollata Desh.	0,80-1,50
fusca Gmel.	1,—	Pirena.		Planaxis.	
gredleri Bttg.	0,30-50	ater L.	1,—	nucleus Lm.	0,20-30
v. cinnamomea Gredl.	0,50	v. perdecollata Rve.	1,—	v. semisulcatus Sow.	0,50
Hanleyi Brot.	0,50-80	v. terebralis Lam.	2,—	pedicularis Lam.	0,50
v. cancellata Bens.	1,—	*bussinoides Oliv.	0,10-20	planicostatatus Sow.	0,30-50
*Hollandri Fer.	0,10-20	*costata Oliv.	0,20-30	sulcatus Born.	0,20-40
Horei E. Sm.	1,—	*Esperi Fer.	0,20	Litiopa.	
Lamberti Crosse	0,50	Melanopsis.		bombyx Rang.	0,20-30
lancea Lea	1,—	aperta Gass.	0,50	Paludina.	
L'Argillierti Ph.	0,40-80	aurantiaca Gass.	0,50-80	Benegalensis Lam.	0,30-50
libertina Gld.	0,30-50	brevis Morl.	0,50	v. zonata Hanl.	0,50
v. Japonica Rve.	0,50-80	Brotiana Gass.	0,50-80	Chinesensis Gray.	0,50-80
v. tenuisulcata Desh.	0,30-50	carinata "	0,30	v. lecythoides Bens.	1,—
lineolata Anth.	1,—	fragilis "	0,30	*contecta Müll.	0,10-20
lirata Bens.	0,20-30	frustulum Morl.	0,50	v. Carniolica Brgt.	0,30-50
livescens Mke.	0,10	fusiformis Gass.	0,36-50	dissimilis Müll.	0,30
Loebbeckei Brot.	1-1,50	Lamberti Souv.	0,50	v. obtusa Tr.	0,50
matheroni Gass.	1,—	lirata Gass.	0,50	*Hungarica Haz.	0,30-50
mitra Meusch.	1,—	mariei "	0,50	Japonica v. Mrts.	0,50
montrouzieri Gass.	0,50	nodosa Fer. v. Jor-		Javanica v. d. B.	0,30-50
moreleti Rve. (maj.)	1—50	danica Roth.	1,—	intertexta Say	0,30-50
Moreleti Rv.	1-1,50	robusta Gass.	0,50	melanostoma Bens.	0,30
nigrita Morl.	1,—	Rossiteri "	0,30	praerosa Gerstf.	1,—
obliquigranosa E. Sm.	0,80-1	Littorina.		stelmaphora Bourg.	0,20
pagoda Lea	0,20-30	angulata Lam.	0,50	*unicolor Oliv.	0,30
perpinguis Hinds.	0,50	carinata D'Orb.	0,10-20	Melantho.	
Petiti Phil.	0,50-1	carinifera Mke.	0,50	decisa Say	0,30
picta Hinds.	0,50	v. pyramidalis Desh.	0,50	v. crassa Say	0,50
plicifera Lea	1,—	granularis Gray.	0,30	v. integra Say	0,50
plutonis Hinds.	1—2	intermedia Phil.	0,20	v. ponderosa Say	0,30-50
porrecta Lea	0,30	v. strigata Phil.	0,30	Georgiana Lea	1,—
pyramis Bens.	0,20	*litorea L.	0,10-20	Pyrguia.	
rossiteri Gass.	0,50	Mauritiana Lam.	0,20-30	nevadensis Stearns.	0,30
scabra Müll.	0,30	melanostoma Gray	0,20-40	Neothauma.	
sculpta Soul (typ.)	0,30	*neritoides L.	0,10	Tanganyicensis E.	
f. major	0,50	v. Basteroti Payr.	0,50	Sm. c. operculum	
setosa Sow.	0,40-60	Philippiana Rve.	0,50	extra fine	50,—
setosa Sws.	1—2	scabra L.	0,20-40	Macrocheilus.	
spinifera Ads.	0,50	v. tenuis Phil.	1,—	misellus Gredl.	1,—
spinulosa Lam.	0,30-50	scutulata Gould.	0,20-30	Bithynia.	
subspinulosa Brot.	0,50	undulata Gray	0,20-30	Leachi var. graeca	
Tamsi Dkr.	0,50	zebra Wood	0,20-30	Westl.	0,30
testudinaria v. d. B.	0,30-40	Tectarius.		levis Morl.	0,50
v. elongata Mouss.	0,40-60	bicolor Lam.	2—3	longicornis Bens.	0,50
v. lutea Mouss.	1,—	breviceulus Phil.	0,50	marginata Ch.	0,20
*tuberculata Müll.	0,10	muricatus L.	0,10-20	monilirata Morl.	0,50
v. punctulata Grat.	0,30-50	pagodus L.	0,50-1	*proxima Frauf.	0,50
v. Cochinchinensis		Modulus.		striatula Bens.	0,50
Mouss.	0,50-1	lenticularis Ch.	0,30-40	*tentaculata L.	0,10
v. tigrina Hutt.	1,—	unidens Ch.	0,20-40	Troscheli Mich.	0,10
tuberculosa Rang.	1,50				
variabilis Bens.	1—2				

Stenothyra.		Mk.			Mk.			Mk.
cingulata Bens.	0,50		*striata Mtg.	0,20		speciosa Phil.	3,—	
divalis Gld.	0,50		*violacea Desm.	1,—		Sumatrensis Phil.		
Lithoglyphus.			*v. rufilabris Leach	1,—		c. op.	2,50	
modestus Gredl.	0,50		Alvania.			Tamsiana Phil.	2,—	
*naticoides Fer.	0,10		*calathus F. et H.	0,20-30		turbis Phil.	0,30-50	
*v. danubialis Kim.	0,30		*cimex da Costa	0,30		v. subglobosa Nev.	1,—	
Fuchsianus v. Moell.	0,50		*v. fasciata Phil.	0,50		vitrea Born. c. op.	1,—	
Spekia.			*v. granulata Phil.	0,50		Lanistes.		
zonata Wood.	5,00		*crenolata Mich.	0,10		Bolteniana Ch.	1—2	
Bythinella.			*punctura Mtg.	0,30		carinata Oliv.	1,50	
epirotica Bttg.	0,30		*reticulata Mtg.	0,10		Lybica Morl.	0,50-1	
Rissoina.			Assiminia.			purpurea Jon.	0,80-1,50	
*Brugueri Payr.	0,10-20		brevicula Pfr.	0,50		Marisa.		
Rissoa.			v. flavida Pfr.	0,50		cornu-arietis L.	0,50-1	
*algeriana Montr.	0,20		Francesii Gray.	0,20		Turritella.		
*arenaria Middf.	0,50		*Grayana Leach	0,20		attenuata Rv.	1,50-2	
*auriscalpium L.	0,10-20		Japanica v. Mart.	0,20		bacillum Kien.	1—2	
*cahatus Forb.	0,50		lutea Ads.	0,30		Banksi Gray.	1,50	
*carinata Cost.	0,50		Moellendorffi Bttg.	0,50		bicingulata Lm.	0,50-1	
*carbiaea D'Orb.	0,50		violacea Heude.	0,50		carinifera Lm.	2,—	
*costata Desm.	0,30		Valvata.			cingulata Sow.	1—2	
*costulata Ald.	0,20		tolosana S. Sim.	0,50		cingulifera Sow.	0,40-60	
*dolium Nyst.	0,50		Ampullaria.			columnaris Kien.	3,—	
*Guerini Reclz.	0,50		ampullacea L.	0,50-2		*communis Risso	0,30-50	
*v. decorata Phil.	0,50		Australis D'Orb.	1—3		*v. nivea Sow.	1,—	
*Jeffreysi Walk.	0,50		canaliculata Lam.	2,—		*v. unguina S.	1,—	
*inconspicua Ad.	0,10-20		carinata Sw.	2,—		cochlea Rve.	1-1,50	
*labiosa Mtg.	0,20		Columbiensis Müll.	1,50		crocea Kien.	2—3	
*lineolata Mich.	0,50		crassa Sw.	0,40-60		Cumingi Rve.	3,—	
*membranacea Ads.	0,20		crostoma Phil.	1,50		duplicata L. fine	1—2	
*monodonta Biv.	0,20		Cumingi King.	2,—		v. replicata L.	3,—	
*parva da Costa	0,10		decussata Moric.	0,50		goniostoma Val.	1—2	
*v. interrupta Johnst.	0,20		depressa Say	1,—		terebr. L. fine	1—2	
*radiata Phil.	0,20		v. Hopetonensis Lea	1—2		*triplicata Broch.	0,50-1	
*reticulata Mtg.	0,20		effusa Müll.	2—3		Mesalia.		
*rudis Phil.	1,—		encaustica Rve.	3,—		brevialis Lm. c. op.	2—3	
*rufilabris Leach	0,50		figulina Spix	1,—		Thylacodes.		
*v. lilacina Reclz.	0,50		flagellata Say	0,50-1		longifilus Mörch	2—3	
*saxatilis Moell.	0,50		glauca L.	0,50-1		polyphragma Sassi	3,—	
*similis Scach	0,20		geveanensis Desh.	1—2		Novae Holland. Rve.	5,—	
*v. laevis Wats.	0,50		v. fasciata Desh.	2,—		Siliquaria.		
*striata Ads.	0,50		gigas Spix.	3,—		Bernardi Mörch	1—2	
*subcostulata Schw.	1,—		globosa Sw.	0,50-1,50		trochlearis Mörch		
*variabilis Mühlf.	0,10		insularum D'Orb.	1—3		Onustus.		
*v. splendida Eichw.	0,20		Kordofana Parr.	2,50		exustus Rve.	4—6	
*ventricosa Desm.	0,20		Layardi Rve. c. op.	1,50		solaris L.	12,—	
*venusta Phil.	1,—		luteostoma Sw.	2—3		Xenophora.		
Cingula.			Malabarica Phil.	1-1,50		conchylophora Brn.	3—4	
*cancellata Cost.	1,—		neritoides D'Orb.			corrugata Rve.	6,—	
*cingillus Mtg.	0,30		(grande)	5—10		pallidula Rv.	2—5	
*dictyophora Phil.	1,—		nobilis Rve.	3,—		sinensis Phil.	1—5	
*fulgida A. Ad.	0,30		orinocoensis Ziegl.	2—3		Calyptraea.		
*lanziae Calc.	0,50		nigrilabris Phil.	1,50		equestris L.	1,—	
*minuta Tott.	1,—		paludinosides Crist.	1-1,50		tectum-sinense Ch.	0,50-1	
*Montagui Payr.	0,30		pomum Phil.	2—3		cicatricosa Rv.	2,—	
*semistriata Mtg.	0,20		reflexa Sw.	1—2				
			scutata Mouss.	1—2				

Crucibulum.		Mk.	Nerita.		Mk.			Mk.
cinereum Rv. . .	0,40-1		albicilla L. . .		0,20-30	Cumingiana Reclz.		0,20-40
corrugatum Carp. .	1,50		v. nigro-alba-bifas-			dilatata Brod. . .		0,30-50
imbricatum Brod. .	0,50-1		ciata		0,50	dubia Chm. . . .		0,30-50
lividum Rve. . .	1,—		v. rubro maculata .		0,50	fluviatilis L. . .		0,10
morbidum Rv. . .	1,50		annulata Rve. . .		1 —	v. thermalis Boub		0,10
pallidula Rv. . .	2—5		Antillarum Gm. . .		0,20-30	frondosa Mouss. .		0,50
papyracea Ads. . .	1,50		atrata Ch.		0,30	gagates Lam. . .		0,50
rugosum Desh. . .	1,—		bisecta Rve. . . .		0,50	granosa Sow. . .		0,50-1,50
scutellum Gray . .	1-1,50		chamaeleon L. . . .		0,30-50	Layardi Rve. . .		0,50
spinosum Sow. . .	0,50-1,50		chrysostoma Reclz. .		0,30-50	lattissima Brod. .		0,50-80
tubiferum Less. . .	1,—		costata Ch.		0,50	Listeri Pfr. (Hayti)		0,50
umbrella Desh. . .	0,50-1,50		Deshayesi Rel. . . .		1—2	longispina Reclz. .		0,50-1
Trochita.			exuvia L.		0,30-60	Madecassina Morl. .		0,50
mamillaris Brod . .	0,30-50		funiculata Rv. . . .		0,50	meleagris Lm. . .		0,10-20
radians Dsh. . . .	0,50-1,50		histrio L.		0,30-50	Mertoniana Reclz. .		0,10-20
*Sinensis L. . . .	0,50		Leguilleana Recl. . .			nouletiana Gass. .		0,30
spirata Forb. . . .	2,—			c. op.	1,—	nucleola Morl. typ.		0,20-30
Galerus			lineata Ch.		0,30-50	v. plicata Morl. . .		0,50
maculatus Quoy . .	1,50		v. costis-albo-macul.		1,—	v. spinosa Sow. . .		0,30
Crepidula.			v. pallide-fasciata .		1,—	v. xanthocheila Morl		0,50
aculeuta Gm. . . .	0,30-50		Mauritiae Recl. . . .		1,—	Philippinarum Sw. .		0,50-1
adpersa Dkr. . . .	0,30-50		ornata Sow.		0,50-80	picta Sow.		0,20-30
bilobata Gray . . .	0,30-50		v. ovata Sow.		1,50	piperina Ch. . . .		0,50
Capensis Quoy . .	1,—		oleacina Rve. . . .		1,—	Pritchardi Dhrrn. .		0,30-50
dilatata Lm. . . .	1,—		peloronta L.		0,30-50	pulchra Sow. . . .		1,—
v. nautiloides Less.	1,—		pica Gould		0,50	pulligera L.		0,30-50
echinus Brod. . . .	0,30-50		planospira Ant. . . .		0,30-60	pulligiroides Recl. .		0,50
excavata Brod. . .	1-1,50		plexa Ch.		0,60-1	pupa L.		0,10
explanata Brod. . .	1,50		plicata L.		0,30	v. minor L.		0,10
grandis v. Midd.			v. nigro-bifasciata .		0,50	retropicta Mrts. . .		0,20-50
(species)	1,—		v. nigro-maculata .		0,50	Roissyana Reclz. .		0,50
glauca Say	1,—		v. rubro-trifasciata		0,50	Sandwichensis Dsh.		0,50
hepatica Desh. . .	0,30-50		polta L.		0,30-50	Sowerbyana Recl. .		0,30-50
v. complanata Krss.	1—2		praecognita C.B.Ad.		0,20-30	squamaepicta " . .		0,50
incurva Brod. . . .	0,30-50		quadricolor Gm. . . .		0,30-50	subpunctata " . .		0,30-50
lirata Rve.	0,50-1		Rumphii Reclz. . . .		0,30-50	sumatrensis Soul. .		0,50
monocycla Less. . .	1,—		Senegalensis Gm. . .		0,30	tristis Orb.		0,20-30
Navicelloides Nutt.	1,—		signata Lm.		0,30-50	Turtonis Reclz. . .		0,50
Peruviana Lm. . . .	0,40-1		squamulata Leguill.		0,20-50	Ualanensis Less. .		0,50
plana Ads. et Rve.	2,—		tesselata Gm.		0,20-30	variegata Less. . .		0,30-50
v. Walshi Herm. . .	2,—		undata L.		0,30-50	virginea L.		0,10-20
Proteus D'Orb. . .	1-1,50		versicolor Lm. . . .		0,20-50	viridis L.		0,10-20
rugosa Nutt. . . .	2,—		Yoldii Reclz.		0,30-50	zebra Lm.		0,30-50
unguiformis Lam. .	0,50-1					Navicella.		
Pileopsis.			Neritina.			Borbonica Bory . .		0,50-1
*Hungaricus Lm. . .	0,50-1,50		aquatilis Rve. . . .		0,30-50	Bougainvillei Reclz.		0,50
lamellosus Ch. . .	0,30-50		auriculata Lm. . . .		0,20-40	orbicularis Sow. .		0,50-1
subrufus Lm. . . .	0,20-50		brevispina Lm. . . .		0,30-40	porcellana L. . . .		0,50
Hipponix.			v. mutica Mrts. . . .		0,50	tesselata L.		1,—
antiquatus L. . . .	1,—		Brugieri Recl. . . .		0,50	Phasianella.		
Australis Dsh. . .	0,30-50		caffra Gray		0,20-50	Australis Gm. . . .		1—3
barbata Sow. . . .	0,30-50		canalis Sow.		0,50	Capensis Dkr. . .		0,20-30
Narica.			chimnoi Rve.		1—2	elongata Krss. . . .		0,30-50
acuta Reclz. . . .	1,—		communis Quoy . . .		0,20-50	Graeffei Dkr. . . .		0,50-80
Neritopsis.			cornea L.		0,30-50	Kochii Phl.		0,20-30
radula L.	1,—		cornuta Rve.		1—2	marmorata Duf. . .		0,50-80
			corona L.		0,50	pygmaea Ph.		0,20
			crepidularia Lm. . .		0,30-50	rubens Lam.		0,50-1
			cryptospira Mouss.		0,50			

	Mk.		Mk.		Mk.
*tenuis Mich. . . .	0,20-30	brevispinum Lam. .	1-2	formosa Rve. . . .	3-5
v. intermedia Sc. .	0,30	calcar L.	0,80-1	lacinata Lm. . . .	1-2
tessellata C. B. Ad.	0,20	columellare Phil. .	1-2	Livonia.	
variegata Lam. . .	0,30-50	confragosum Gld. .	1-2	pica L.	0,50-2
zebra Gray	1,-	costulatum Lam. .	0,50-2	Trochus.	
Turbo.		heliacum Phil. ext.	3-5	acutangulus . . .	2-3
argyrostomus L. . .	0,50-1	latispinum Phil. .	1-2	maximus Koch. . .	1-3
" extra	2,-	longispinum Lm. .	2-4	" extr.	3-5
artensis Montrz. .	1-1,50	papillatum Pot. . .	1-2	Niloticus L. . . .	1-2
articulatus Rve. . .	0,50-1,50	planum Gm.	0,50-1	" extr.	3,-
canaliculatus Gm. .	3,-	rotularium Lam. .	2-3	Cardinalia.	
castaneus Gm. . . .	0,40-1	spinulosum Lam. .	1-3	virgata Gm. . . .	1-2
cidaris Gm.	0,50-1,50	stellatum Chm. . .	2-3	Pyramidea.	
concinuus Ph. . . .	0,60-1	Uvanilla.		caerulescens Lm. .	2-3
cornutus Gm. . . .	2-4	Buschi Ph.	0,50-1	dentata Forsk. . .	1-3
coronatus Gm. . . .	0,50-1	o'ivacea Wodd. . .	1-2	fenestrata Gm. . .	0,50-1
" extra	2,-	tentoriformis Jon. .	1-2	Mauritiana Gm. . .	1,-
Coreensis Recl. c.op.	0,50-1	unguis Wood . . .	1-2	nodulifera Lam. . .	1-3
crassus Wood	3-5	Pachypoma.		pyramis Born. . .	0,50-1,50
chrysostomus L. . .	0,50-2	Americanum Gm. . .	1,-	Polydenta.	
crenulatus Gm. . . .	0,50-1	caclatum Ch. . . .	0,50-2	calcarata Souv. . .	1-1,50
fluctuatus Rve. . .	1-2	" extra	3,-	crenifera Phil. . .	1-2
v. Fokkesi Jon. vera	1-2	Cooki Chm.	3,-	concinna Ph. . . .	1,-
grandineus Val. . .	1-2	Cubanum Phil. . .	0,50-1,50	Erythraea Broch. .	0,50-1
granulatus Gm. . . .	0,50-1	Japonicum Dkr. . .	10-20	flammulata Lam. .	1-3
Hemprichi Trschl. .	0,50-1	imbricatum Gm. . .	1-3	gibberula Ads. . .	1-1,50
lugubris Rve. . . .	1-1,50	modestum Rve. . .	2-4	granosa Lm.	0,50-1
marmoratus L. . . .	1-2	plicatulus Phil. . .	1,-	incarnata Fisch. .	1-1,50
" extr. gr. c.op	5,-	rhodostomum Lam. .	1-2	Jonasi Phil.	1-2
modestus Phil. . . .	1,-	*rugosum L.	0,50-1	maculata L.	0,50-1,50
natalensis Krss. . .	1-1,50	tuber L.	0,50-1	radiata Gml. . . .	0,40-1
niger Gray	0,50-1	" extra	2,-	sacellum Phil. . . .	1-1,50
petholatus L. . . .	1-2	undosum Wood ext.	2-5	squarrosa Lm. . . .	1-1,50
porcatus Rve. . . .	0,50-1,50	Liotia.		tubifera Kien. . . .	1,50
porphyrites Martyn	0,60-1	Hermanni Dkr. . .	0,50-1	verrucosa Gm. . . .	1-2
v. versicolor Gm. . .	0,50-1,50	Cyclostrema.		Clanculus.	
princeps Phil. . . .	5,-	*Cutleriana Clark .	0,20-40	carinatus Ads. . . .	1,-
pulcher Rve.	1-3	Adeorbis.		*corallinus Gm. . .	0,20-40
punctulatus Mart. .	1-2	*subcarinata Mtg. .	0,20-30	v. multigranus Phil.	0,50
Quoyi Kien.	0,50	Mölleria.		*cruciatus L. . . .	0,10-20
radiatus Gmel. . . .	1-2	*costulata Möll. . .	0,30-50	Dunkeri Cox. . . .	0,50
Sarmaticus L. . . .	1-3	Rotella.		Guineensis Gm. . .	2,-
saxosus Wood. . . .	0,50-1	conica Ads et Rve. .	1,-	*Jussieui Payr. . .	0,10-20
setosus Gm.	1-3	costata Val.	0,50-80	limbatus Gray . .	1,-
smaragdus Gm. . . .	0,40-1	gigantea Less. ext.	1-2	maxillatus Mke. . .	1,-
sparverius Gm. . . .	1-3	monilifera Lm. . . .	0,50	nodiliratus Ads. .	1,-
Spenglerianus Gm. ex	3-6	superba Gould. . .	0,50	obscurus Dkr. . . .	1,-
spinosus Gm.	0,50-1	suturalis Lm. . . .	0,50-1	Pharaonis L. . . .	0,40-60
tesselatus Kien. . .	1-3	vestiaria L.	0,30	puniceus Ph. . . .	0,40-50
Ticaonicus Rve. . .	0,50-1	v. lineolata Lam. .	0,50	spadiceus Phil. . .	1,50
torquatus Gm. . . .	1-3	v. elegans Bk. . . .	0,30	stigmatarius A. Ad.	0,60-80
undulatus Ch. . . .	0,50-1,50	v. rosea Lm.	0,50	Thomasi Crosse . .	1,-
Collonia.		Zelandica Hombr. .	0,30-50	unedo A. Ad. . . .	0,50
*sanguinea L. . . .	0,20-30	Delphinula.		urbanus Gm. . . .	1-1,50
Astraliun.		atrata Ch.	1-2	Monodonta.	
aculeatum Gm. . . .	1-1,50			*articulata Lm. . .	0,30-50
auripigmentum Jon.	1,-				

	Mk.		Mk.		Mk.
<i>Australis</i> Lm. . .	0,50-80	<i>Bankivia.</i>		<i>*varia</i> L.	0,20-30
<i>canalifera</i> Lam. . .	1,—	<i>v. fasciata</i> Bk. . .	0,20-40	<i>*villica</i> Ph.	0,20-30
<i>carinifera</i> Beck. . .	1-1,50	<i>v. fulminata</i> Bk. . .	0,30-50	Trochiscus.	
<i>*crassa</i> Mtg.	0,20-30	<i>v. nitida</i> A. Ad. . .	0,30-50	Norrisi Ads c. op.	5—8
<i>labio</i> L.	0,30-60	Trochocochlea.		Margarita.	
<i>neritoides</i> Phil. . .	0,30-50	<i>aethiops</i> Gm.	0,20-40	<i>*albula</i> Gould . . .	1,—
<i>punctulata</i> Lm. . .	0,30-50	<i>v. neritoides</i> Born	0,50	<i>*argentata</i> Wood . .	0,50
<i>*turbinata</i> Born . .	0,20-40	<i>constricta</i> Lm. . . .	0,40-80	<i>*bella</i> Verkr.	0,50-1
<i>zealandica</i> Quoy . .	0,50	<i>multicarinata</i> Lm. .	0,30-50	<i>*cinerea</i> Gould . . .	0,20-50
Euchelus.		<i>pellis-serpentis</i> Wd.	1-1,50	<i>*Groenlandica</i> Bk. .	0,20-40
<i>atratus</i> Gm.	0,40-50	<i>striolata</i> Quoy . . .	1,—	<i>*helicina</i> Fabr. . . .	0,20-30
<i>baccatus</i> Mke. . . .	0,40-50	<i>Tamsi</i> Dkr.	0,30-60	<i>*lirulata</i> Carp. . . .	0,50
<i>tricarinatus</i> Lam. .	1-1,50	<i>zebra</i> Wood	0,50-1	<i>*obscura</i> Couth. . .	0,50-1
Diloma.		Oxysteles.		<i>pupilla</i> Gld.	0,30-50
<i>morio</i> Trosch.	0,50	<i>impervia</i> Mke. . . .	0,30-50	<i>*striata</i> Leach. . . .	1,—
<i>nigerrima</i> Ch.	0,50	<i>indecora</i> Phil. . . .	1,—	<i>*umbilicalis</i> Br. et S.	0,50-1,50
<i>tenera</i> Trschl. . . .	0,30-40	<i>merula</i> Ch.	0,50-1	<i>*undulata</i> Sow. . . .	0,50-80
Thalotia.		<i>tabularis</i> Krss. . . .	0,30-40	<i>*varicosa</i> Mighl. . .	0,50-80
<i>conica</i> Gray	0,20-30	<i>Tamsi</i> Dkr.	1,—	<i>*violacea</i> King . . .	1,—
<i>elongata</i> Wood . . .	0,50-1	Chlorostoma.		Stomatella.	
<i>monilifer</i> Ads. . . .	0,30-50	<i>argyrostomum</i> Gm.	0,40-1	<i>Baconi</i> Ads.	1—2
<i>pulcherrima</i> Wood .	1,—	<i>ater</i> Less.	0,40-1	<i>imbricata</i> Lm. . . .	0,80-1,50
<i>purpurata</i> Mart. . .	1,—	<i>brunneum</i> Phil. . . .	1,—	<i>Mariei</i> Crosse	1—2
Zizyphinus.		<i>Carpenteri</i> Dkr. . .	0,50	<i>picta</i> D'Orb. def. . .	0,50
<i>annulatus</i> Martyn. .	1,—	<i>funerale</i> A. Ad. . . .	0,40-60	Stomatia.	
<i>armillatus</i> Wood . .	1,—	<i>gallina</i> Forb.	0,50-80	<i>phymotis</i> Helb. . . .	2—4
<i>canaliculatus</i> Mart.	1,—	<i>luctuosum</i> Orb. . . .	0,60-1	Gena.	
<i>Chemnitzii</i> Phil. . .	1,—	<i>rusticum</i> Gm.	0,30-50	<i>planulata</i> Lm. . . .	0,60-1
<i>conulus</i> L.	0,20-50	<i>Pfeifferi</i> Phil. . . .	0,50-80	Haliotis.	
<i>*v. zizyphinus</i> L. vera	1,—	Omphalius.		<i>alternata</i> Sow. . . .	1,50
<i>*v. granuloides</i> L. „	0,50-1	<i>carneolus</i> Lm. . . .	0,40-60	<i>astriata</i> Rve.	2,50
<i>costatus</i> Crptr. . . .	0,80-1	<i>excavatus</i> Lm. . . .	0,20-40	<i>bistriata</i> Gm. fine . .	2—3
<i>Cunninghami</i> Gray .	3—5	<i>rubroflammulatus</i>		<i>Capensis</i> Dkr. . . .	2—4
<i>*dubius</i> Phil.	0,30-50	Koch	1,—	<i>Californiensis</i> Dkr.	3,—
<i>*exasperatus</i> Pen. . .	0,30-50	<i>scalaris</i> Ant.	0,30-50	<i>coccocradiata</i> Rve. .	1-1,50
<i>eximius</i> Rve.	1,—	<i>*umbilicaris</i> L. . . .	0,20-30	„ Original	
<i>*exiguus</i> Pultn. . . .	0,10-20	<i>viridulus</i> Gm. . . .	0,30-50	<i>Martini</i> et Chem. . .	3,—
<i>*granulatus</i> Born . .	0,30-80	Monilea.		<i>corrugata</i> Gray ext.	10,—
<i>*gualtieri</i> Phil. . . .	0,30-50	<i>lentiginosa</i> Ads. . .	0,50-1	<i>Cracherodi</i> Leach. .	0,50-1,50
<i>iridescent</i> Midd. . .	1,—	Gibbula.		<i>decussata</i> Phil. . . .	1,—
<i>Japonicus</i> Ads. . . .	0,50	<i>*Adansonii</i> Payr. . .	0,10-20	<i>Dohniana</i> Dkr. . . .	1—2
<i>jubilinus</i> Gm.	0,60-1	<i>*v. Adriatica</i> Ph. . .	0,20-30	<i>exigua</i> Dkr.	1,—
<i>*Laugieri</i> Payr. . . .	0,20-40	<i>albida</i> Gm.	0,20-50	<i>funeris</i> Rve.	2—3
<i>*millegranus</i> Ph. . .	0,20-60	<i>Capensis</i> Gm. . . .	0,30-40	<i>gigantea</i> Chem. . . .	1—2
<i>ornatus</i> Lam.	0,50	<i>*cicer</i> Mke.	0,30	<i>v. discus</i> Rve. . . .	2—3
<i>papillosus</i> Cost. . .	0,50	<i>*cineraria</i> L.	0,10-20	<i>v. Kamschatkana</i>	
<i>v. granulatus</i> Bora	0,50	<i>constellata</i> Sow. . .	0,50	Jon. sp.	1—3
<i>*striatus</i> L.	0,10-20	<i>crinita</i> Ph.	0,20-50	<i>v. tubifera</i> Lam. . .	1—2
<i>v. depictus</i> Desh. . .	0,20	<i>*divaricata</i> L.	0,10-20	<i>glabra</i> Ch.	1,—
<i>scitulus</i> Ads.	1,—	<i>*fanulum</i> Gm.	0,20-50	<i>Gruneri</i> Phil.	1-1,50
<i>splendidus</i> Phil. . .	1—2	<i>*Fermoni</i> Payr. . . .	0,10-30	<i>Japonica</i> Rve. . . .	2—3
Cantharis.		<i>*magus</i> L.	0,20-80	<i>Iris</i> Gm.	0,50-1,50
<i>iris</i> Ch.	1—2	<i>v. senegalensis</i> v.M.	0,20-30	<i>Mariae</i> Gray Orig.	
Elenchus.		<i>*Richardi</i> Payr. . . .	0,20-40	<i>Mart. et Chemn.</i>	8,—
<i>bellulus</i> Ph.	0,30-50	<i>*tumida</i> Mtg.	0,20-40	<i>marmorata</i> Gray . .	1-1,50
<i>irisodontes</i> Quoy . .	0,30-50	<i>*umbilicata</i> Mtg. . .	0,20-30	<i>Midae</i> L. extra . . .	3,—

	Mk.		Mk.		Mk.
nebulata Rve. . .	1,50	*v. Europaea Sow. .	0,30-50	lacteam Desh. . .	1,—
planilirata Rve. . .	1—3	lata Sow. extra . .	3,—	longitrorsum Rve. .	1—2
pustulata Rv. . .	0,50-1	limbata Sow. . .	0,50-80	Maltzani Dkr. . .	3,—
rufescens Sw. . .	1—3	Lincolni Gray . . .	1,—	octogonum Desh. .	0,80-1
rugoso-plicata Ch. .	1—2	larva Rve.	1,—	Philippinarum Sow.	1,—
v. Australis Gm. fine	5,—	Listeri Orb.	0,30-50	politum L.	1—2
sanguinea Hanl. . .	0,50-1,50	maxima Sow.	1—3	v. laeve Turt. . . .	2,—
semistriata Rve. . .	1,—	minuta Sow.	1,—	pseudo-hexagonum	
splendens Rv. . . .	1—3	mutabilis Sow. . . .	0,30-50	Desh.	1,50
squamata Rve. . . .	0,50-1	*neglecta Desh. . . .	0,50-1	subulatum Desh. . .	1,—
subvirginica Dkr. . .	2,—	nigropunctata Sow.	0,50-80	*vulgaris Cost. . . .	0,50
submarmorata Rve.	1-1,50	nimbosa L.	0,50-1		
v. gibba Rve.	2,—	*nubecula L.	0,30-50	Antalis.	
*striata Gm.	1,—	nigra Less.	1,—	Delessertiana Chenue	5,—
Tayloriana Rv. . . .	1—2	v. violacea Erch. fine	1—2	Vernedi Ads.	12—15
*tuberculata L. . . .	0,50	nodosa Born	0,30-50	Patelloidea.	
* „ extra fine . . .	1,—	oriens Sow.	2,—	alveus Conr.	0,30
*v. lamellosa Lam. . .	0,30 1	Peruviana Sow. . . .	1,50	angulus Eschh. . . .	1—2
tumens Pfr.	2—3	picta Gmel.	2—3	Araucana Orb. . . .	0,30-50
varia Pfr.	0,50-1	pustula Lm.	0,50	cassis Eschh.	0,30-50
ziczac Rve.	1,—	*reticulata Donov. .	0,30-50	concinna Lischke . .	0,30-50
Teinotis.		rosea Lam.	1-1,50	Chiloensis Rve. . .	1-1,50
asinina L.	0,50-1	rudis Desh.	1-1,50	conoidea Quoy . . .	0,30
Padollus.		scutella Gray	1-1,50	diaphana Nutt. . . .	0,30-50
clathratus Rve. . . .	1—2	virescens Sow. . . .	0,30-50	digitalis Esch. . . .	0,30-50
Dringi Rve.	1-1,50	viridula Lam.	0,30-50	discors Phil.	0,30-50
Emmae Gray fine . .	2—3	Fissurellidae.		floccata Rve.	0,30-40
excavatus Lm.	1—2	hiantula Lm.	1,—	fluviatilis Bldf. . .	0,30-50
naevosus Mart. ext.	2—3	inornata Krss.	1,—	gigantea Gray . . .	1—2
ovinus Ch.	1-1,50	Macrochisma.		Heroldi Dkr.	0,40-50
parvus L.	1,50	Tasmaniae Gray . . .	5,—	v. conulus Dkr. . . .	0,40-50
pulcherrimus Mart.	1,—	Pupillia.		leucopleura Gm. . .	0,30-50
Roei Rv.	1—2	aperta Sow.	3—5	lenticinosa Rve. . .	0,30-50
sanguineus Hanl. . .	0,50-1,50	nigrita Sow.	3—5	melanosticta Gm. .	0,50
Fissurella.		Cemoria.		mesoleuca Mke. . . .	0,30-50
adpersa Phil.	1,—	noachina L.	0,50	Mexicana Brod. . . .	3—5
alabastrites Rv. . . .	0,20-50	Emarginula.		Mülleri Dkr.	1,—
alba Phil.	1,—	conoidea Sow.	1,—	Nuttalliana Rvo. . .	0,30-50
asperella Sow.	0,50-1	depressa Blvll. . . .	1,—	notata L.	0,30-50
Barbadensis Gm. . . .	0,20-30	tricostata Humph. . .	1,—	paradisiaca d'Orb. .	0,30
biradiata Fremb. . .	1-1,50	Parmophorus.		patina Eschh.	0,30-50
calyculata Sow. . . .	0,30-50	Australis Lm.	0,50-1,50	pelta Dall.	1—2
Cayenneensis Lam. . .	1,—	corrugatus Rve. . . .	1,—	penicillata Rve. . .	0,30
Chilensis Sow.	1—2	ossea Gould	2,—	persona Eschh. . . .	0,30-50
costata Less.	0,50-80	unguis L.	0,50-1	sacharina L.	0,30-50
crassa Lm.	0,50-1	Dentalium.		v. lanx Rve. (spec.)	0,30-50
crenulata Sow.	3—5	abyssorum Sars	1-1,50	scabra Nutt.	0,50
Cumingi Rve.	1,50	aprinum L.	1—2	scutum Eschh.	0,30
Dysoni Rve.	0,50	bisexangulum Sw. . .	2,50	Schrencki Lischke . .	0,30-50
Edita Rve.	0,50-80	*dentale L.	0,30-50	spectrum Nutt. . . .	0,30
elongata Phil.	1,—	*v. crocea Mont	1,—	tenera Ads.	0,50
fascicularis Lam. . . .	1,—	*v. resea Mont.	1,—	*testudinalis Müll. .	0,20-30
galericulum Rve. . . .	0,50-1	elephantinum L. . . .	6—8	*v. pallida Sow. . . .	0,50
*gibberula Lm.	0,20-40	fasciatum Gm.	1,50	variabilis Sow. . . .	0,20-40
*v. minuta Cost. . . .	0,30	Japonicum Dkr.	1,—	*virginica Müll. . . .	0,20-30
*glaucoopsis Rve. . . .	1,—			viridula Lm.	0,30-50
*gracea L.	0,30-50			v. Pretrei d'Orb. . .	1,—
				zebrina Less.	0,30-50

Scurria.	Mk.		Mk.		Mk.
pallida Sow.	0,50	*olissypsonensis Gm	0,50-1	spinosus Brug.	2—3
scurra Less.	1,—	Paumotensis Gould	1-1,50	squamosus L.	0,50-1
Helcion.		pectacea Meusch . . .	1,—	Stelleri Midd.	
pectinatus L.	0,30-50	petelata Rve.	0,30-50	extr. fine	10—20
spiniferus Lm.	0,50-1	plana Rve.	0,30-50	tunicatus Wood . . .	1-2,50
Lepeta.		plicata Born	0,50-1	Aplustrum.	
ancyloides Forb. . . .	0,50	*plumbea Lam.	0,30-50	Thalassiarchi Mart.	0,50-1
*caeca Müll.	0,50	pruinosa Krss.	0,40-60	Hydatina.	
Gadinia.		*punctata Lam.	0,30-50	albicincta Höwen . .	2—3
*Garnoti Payr.	0,30-50	puncturata Lam. . . .	0,20-30	physis L.	0,50-1
Peruviana Sow.	1,—	radians Gm.	0,80-1	v. virgata Mart. . . .	1,—
varians Garrett	1,—	rota Chm.	0,50-1,50	vexillum Ch.	1-1,50
Patella.		rustica L.	0,50-1	Bullina.	
Adansoni Dkr.	1—2	extra fine	2,—	lineata Wood.	1,—
aenea Martyn	0,30-50	Schroeteri Krss. . . .	1-1,50	nitidula Lister	1-1,50
Argenvillei Krss. . . .	0,50-1	*scutellaris Lam. . . .	0,20-50	Cylichna.	
articulata Rv.	0,30-50	spinifera Lam.	0,50-1	*alba Brown	0,50
amussitata Rve.	0,50	Surinamensis Gm. . . .	1,—	arachis Quoy	2,—
apicina Lam.	1—3	testudinaria L.	0,50-1	*corticata Penn. . . .	0,50-1
*athletica Lam.	0,30-50	toreuma Rve.	0,30-50	gracilis Quoy	2,—
barbata L.	0,50-2	v. tenuilirata Carp. . .	0,50-80	Jeffreysi Mtg.	0,50
*caerulea Lm.	0,20-40	tramoserica Mart. . . .	0,30-50	*striata Brown	0,50
*v. aspera Lm.	0,30-50	umbella Gm.	0,50-1	*umbilicata Mtg.	1,—
*v. angulata Lm.	0,30-50	v. miniata Born	0,50-80	Tornatina.	
*v. fragilis Phil.	0,30-50	varicosa Rve.	0,50	coarctata Ads.	1,—
*v. radiata Lm.	0,50	variegata Rve.	0,30-50	olivula	1,—
v. senegalens. v. Mltz.	0,50	*vulgata L.	0,10-30	Bulla.	
*v. subplanata Pot. . .	1,—	Nacella.		Adansoni Ph.	0,30-50
*v. Tarentina Salis . .	0,50	depicta Hinds.	1,50	ampulla L.	0,50-1
Capensis Gm	0,30-50	hyalina Phil.	1—3	aspersa A. Ad.	0,50-1
cochlear Born	0,40-80	insessa Hinds	2,—	bifasciata Mart.	2—3
compressa L.	0,50-1	instabilis Gould	2—3	intermedia Arad. . . .	0,50-1,50
extra	2,—	*laevis Lam.	0,50-1	maculosa Mart.	0,50
*costosoplicata Mart.	1,—	*pellucida L.	0,30-50	nebulosa Gld.	0,50-80
*v. ferruginea Gm. . . .	1,—	radians Gm.	2—3	oblonga A. Ad.	0,40-80
clypeaster Less.	0,50-1	vitrea Phil.	2—3	punctata A. Ad.	0,40-80
conspicua Phil.	0,50-1	Tornatella.		solida Gm.	1,—
cretacea Rve.	1,—	*tornatilis L.	0,20-40	*striata Brug.	0,20-50
deaurata Gm.	0,50-1	Buccinulus.		tenuicula Mko.	1—2
decora Phil.	0,50-1	solidulus L.	0,50-1	tenuissima Sow. . . .	1,—
*deplana Müll.	0,50-80	Chiton.		Haminea.	
exarata Nutt.	0,30-50	aculeatus L. extra	3—5	crocata Pse.	1,—
excavata Desh.	0,50	albus L.	0,50	cymbulum Quoy	0,50
*ferruginea Gm.	0,50-1	assimilis Rv.	1—2	subrufa Dkr.	1,—
ferruginea Sow.	1—2	borbonicus Desh.	1,—	Akera.	
granatina L.	0,30-50	*cajetanus Poli	1,—	*bullata Müll.	1,—
granularis Lam.	0,30-50	*cancellatus Sow. . . .	0,30-50	*v. elastica Sandri . .	1,50
limbata Phil.	0,50-80	Chiloensis Sow.	2,—	Ceylanica Brug def.	0,50
longicosta Lm.	0,50-1	*cinereus L.	0,50	soluta Gm. extr.	2,—
lugubris Blvl.	0,30-50	elegans Fremb	0,50-1	Scaphander.	
*Lusitanica Gm.	0,30-50	granosus „	1,—	*lignarius L.	1,—
Magellanica Gm.	0,30-50	gigas Ch.	2,—	v. alba L.	1,50
*margaritacea Gm. . . .	0,50-80	Japonicus Lischke . . .	1,—	v. curta L.	2,—
nigrolineata Rve.	0,30-50	lineatus Wood	0,50-1		
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		*ruber L.	0,50		

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*aperta L.		0,30-60	fragilis Lam.		3,—	*Mediterranea Lm.		1—2
*v. quadripartita Asc.		1,—	gigas Rang		2—3			
*striatula Jeffr.		1,50	Rumphi Cuv.		1—2			



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